

# **Social Security**

Fourth Edition

Robert J. Myers

Published by

**Pension Research Council**

Wharton School of the University of Pennsylvania

and

**University of Pennsylvania Press**

Philadelphia

© Copyright 1993 by the Pension Research Council of the Wharton School of the University of Pennsylvania

All Rights Reserved

Library of Congress Cataloging-in-Publication Data

Myers, Robert Julius, 1912–  
Social security / Robert J. Myers. — 4th ed.  
p. cm.  
Includes bibliographical references and index.  
ISBN 0-8122-319-0  
I. Social security—United States. I. Title.  
HD7125.M92 1993  
368.4'3'00973—dc20 92-30848  
CIP

Printed in the United States of America

This book was first published in 1993. All facts and figures herein are current as of that year.

# Contents

List of Tables	xxi
List of Abbreviations	xxvii
Foreword	xxix
Preface	xxxix

## Part One

<b>Introduction</b>	1
---------------------	---

<b>1. Social Security Concepts</b>	3
------------------------------------	---

Quest for Security. Methods of Attaining Security. Concept of Social Security: *Types of Social Security Programs. Individual Equity and Social Adequacy. Relative Cost of Social Security versus Private Insurance. Social Insurance as "Insurance." Social Insurance as "Welfare."* Necessity for Compulsory Coverage under Social Insurance Programs. Concept of Poverty. Social Security in the United States.

## Part Two

<b>Old-Age, Survivors, and Disability Insurance</b>	21
---	----

<b>2. Basic Principles and Present Provisions of the OASDI System</b>	23
---	----

Basic Principles of the OASDI System: *Benefits Based on Presumptive Need. "Floor-of-Protection" Concept. Relationship between Individual Equity and Social Adequacy. Earnings-Related Benefits. Self-Supporting Contributory Basis.* Coverage Provisions of the OASDI System: *Nonfarm Self-Employed. Farm Operators. Ministers. Employees of Nonfarm Private Employers. Employees of Nonprofit Organizations. Employees of State and Local Governments. Employees of Federal Government. Employees of Foreign Governments and International Organizations. Farm Workers. Domestic Workers. Tips. Employment Abroad. International Social Security Agreements. Military Service Wage Credits. De-*

## **xii Contents**

*Definition of Earnings. Benefit Provisions of the OASDI System: Insured-Status Conditions. Beneficiary Categories. Benefit Amounts. Earnings Test. Payment of Benefits Abroad. When Monthly Benefits Are Paid. OASDI Financing Provisions: Tax Rates. Taxable Earnings Base. Relative Magnitude of Tax Rates. Interfund Borrowing. Normalized or Advance Tax Transfers. Effect on Unified Budget. Investment of Assets. Administration of OASDI. Income Taxation of OASDI Benefits: Present Law and Procedures. Amounts Are Not Indexed. Examples. Effect on Child Beneficiaries. Three Anomalies. State Taxation. The Longer Run.*

### *Appendixes*

2-1. Coverage of Life Insurance Agents on the Employee Basis under OASDI-HI	152
2-2. Procedure for Reductions in Benefits for Retirement before Normal Retirement Age for Persons Eligible for More than One Type of Benefit	154
2-3. Description of Special Age-72 Benefits	156
2-4. Detailed Descriptions of Eligibility Conditions for Auxiliary and Survivor Benefits and Initial and Final Months for Benefit Payments	159
2-5. Method of Computing PIA and MFB for Persons Attaining Age 62, Dying, or Becoming Disabled before 1979	162
2-6. Alternative Method of Computing PIA for Persons Attaining Age 62 in 1979–1983	170
2-7. Method of Computing PIA Using Wages before 1951	173
2-8. Indexing of Earnings Records, Especially as to Earnings Prior to 1978	177
2-9. Comparison of PIAs for Adjacent Cohorts and for Other Variables	186
2-10. Net Replacement Rates for Persons Retiring at Age 65 and for Young Workers Becoming Disabled or Dying	205
2-11. Detailed Description of Actual Method of Operation of Earnings Test	211
2-12. Automatic-Adjustment Procedures Applicable to Maximum Taxable Earnings Base	214
2-13. Coverage of Noncash Remuneration, Special Types of Payments, Deferred Compensation, and Salary Reductions as Wages	216
2-14. Special Method for Computing PIA for Individuals Who Qualify for Benefits Solely Because of a Totalization Agreement	226

**3. Development of the OASDI System**

229

Coverage: 1935 and 1939 Acts. 1946 Act. Legislation in 1948. 1950 Act. 1954 Act. 1956 Act. 1958 and 1960 Acts. 1965 Act. 1967 Act. 1972 Act. 1977 Act. 1983 Act. Legislation in 1984–90. Monthly Benefit Categories: 1935 and 1939 Acts. 1950 Act. 1952 Act. 1956 Act. 1958 and 1960 Acts. 1961 Act. 1965 Act. 1967 Act. 1972 Act. Court Decisions in 1975–82. Legislation in 1981. 1983 Act. Legislation After 1983. Lump-Sum Benefits: 1935 Act. 1939 Act. 1950 Act. 1981 Legislation. Benefit Amounts: Benefit Formulas during 1976–1978. Benefit Formula for 1979 Cohort. Delayed-Retirement Credit. Special-Minimum Benefit for Long-Coverage Individuals. Minimum and Maximum Benefit Provisions. Lump-Sum Death Payments. Computation of Average Earnings for Benefit Purposes. Elimination of Windfall Benefits. Restrictions on Benefits Payable Abroad. Restriction on Benefits Payable to Prisoners. Automatic-Adjustment Provisions: Opposition to Automatic Adjustments. Arguments in Favor of Automatic Adjustments. Development of Automatic-Adjustment Provisions. Minimum Retirement Ages: 1935 Act. 1956 Act. 1961 Act. 1965 Act. 1967 Act. 1983 Act. Benefit Proportions for Auxiliaries and Survivors: 1939 Act. 1950 Act. 1960 and 1961 Acts. 1972 Act. Insured Status: Fully Insured Status. Transitional-Insured Status. Currently Insured Status. Disability-Insured Status. Quarters of Coverage. Earnings Test: 1935 Act. 1939 Act. 1947 Advisory Council. 1950 Act. 1952 Act. 1954 Act. 1960 Act. Legislation in the 1960s. 1972 Act. 1977 Act. Problems Created by Elimination of Monthly Test. Legislation in the 1980s. Analysis of Liberalization of Earnings Test. Income Taxation of Benefits. Tax Rates: Original Act. Legislation in the 1940s. Legislation in the 1950s. Legislation in the 1960s. Legislation in 1972–73. 1977 Act. 1983 Act. Trend of Ultimate Tax Rate. Self-Employed Tax Rate. Allocation to the Disability Insurance Trust Fund. Taxable Earnings Base. Combined OASDI and HI Taxes. Advisory Councils on Social Security: 1975 Advisory Council. 1979 Advisory Council. 1984 Advisory Council. 1988 Disability Advisory Council. 1991 Advisory Council. National Commission on Social Security. President's Commission on Pension Policy. National Commission on Social Security Reform and the 1983 Act: Formation of National Commission. Functioning of National Commission. A Fair Compromise? Extent of the Financing Problem. Provisions of Legislation Enacted. Coverage Provisions. Benefit Changes. Revenue Provisions. Other Financing Provisions. New Studies Required. OASDI Problems Really Solved? Social Security as an Issue in 1984 Elections. Legislative Procedures: Action in the Executive Branch. Action in the House of Representatives. Action in the Senate. Final Action.

*Appendixes*

3-1. Should Public Systems Withdraw from Social Security?	332
3-2. Unequal Treatment of Men and Women under OASDI: Past Developments and Status Prior to 1983 Act	340

## **xiv Contents**

3-3. Development of OASDI Benefit Formulas Prior to the Current Formula Based on Wage Indexing	343
3-4. The Problem of Instability in the PIA Computation Procedure Prior to 1977 Act; Various Decoupling Proposals for Its Solution	349
3-5. Analysis of Replacement Rates under 1935 and 1939 Acts Relative to Those under Present Law	361
3-6. Comparison of Actual OASDI Benefits Payable in 1975 with Those That Would Have Been Payable if Automatic-Adjustment Provisions Had Been Enacted in 1965	365
3-7. Illustration of How Automatic-Adjustment Procedure Would Have Affected Maximum Taxable Earnings Base if Enacted in 1965	366
3-8. OASDI Proposals of Reagan Administration in 1981	367
 <b>4. Financing Basis of the OASDI System</b>	 372
<i>Why a Fund Develops: Financing by Level Rate. Financing by Increasing Schedule of Rates. Financing by Decreasing Schedule of Rates. Pros and Cons of Increasing Schedule of Rates. Concept of Actuarial Soundness: Definition of Actuarial Soundness. Application of Concept to OASDI. Deficit for Present Members. Normal-Cost Basis. Valuation of Benefits in Current-Payment Status. Views of an Economist. Length of Valuation Period. Pay-As-You-Go Financing. Actuarial Basis of OASDI: Original Law. 1939 Act. 1947-48 Advisory Council. 1950 Act. 1972 Act. Maximum Fund Ratios for Various Past Estimates. Effect of Automatic-Adjustment Provisions. Separate OASI and DI Trust Funds. Use of Cost Estimates in Legislative Process. Financing Basis of OASDI: Financing Basis under 1977 Act. Projected Short-Run Financial Experience as Estimated after 1977. Projected Long-Range Financial Experience as Estimated after 1977. Congressional Responsibility in Financing OASDI. Measurement of Actuarial Status of OASDI. Social Security and the Unified Budget. Investment Procedures: Collection and Transfer of Taxes. Types of Investments. Alternative Possible Investment Procedures. Relationship with Railroad Retirement System.</i>	
 <i>Appendixes</i>	
4-1. Methodology for Actuarial Cost Estimates for Social Security Programs	414
4-2. Interest Rates and Durations until Maturity of Special Issues of Investments of OASDI Trust Funds	451
4-3. Comments on Economic Assumptions in Actuarial Cost Estimates for OASDI	452

## 5. Directions and Issues in OASDI 454

*Laissez-Faire Philosophy. Expansionist Philosophy. Moderate Philosophy. Other Factors Affecting Future Trends. Specific Directions for Development: General Nature of the System. Views of the Public toward OASDI. Benefits. Stabilizing Mechanisms. Fail-Safe Mechanisms. Creditable Earnings Base. Earnings Test. Retirement Age. Coverage. Disability Benefits. Earnings of Married Women. Equal Treatment of Men and Women. Other Benefit-Related Areas. Financing: Tax Rates. Taxable Earnings Base. Government Subsidy. Taxation of Benefits. Issues: Who Pays the Social Insurance Taxes? Are Social Insurance Taxes Regressive? Should OASDI Be Partially Financed from General Revenues? Do Young Persons Get Their Money's Worth? Does OASDI Decrease or Increase Private Savings? Burden of OASDI-HI Taxes versus That of Income Taxes. Making OASDI Be an Instrument for General Fiscal and Economic Planning.*

### *Appendixes*

5-1. History of the Retirement Age under OASDI and Possible Future Changes 518

5-2. Various Approaches to Provide Equal Treatment by Sex in the Computation of Social Security Benefit Amounts 524

5-3. Comparison of Actuarially Purchasable Benefits with Actual Ones 528

## **Part Three** **Medicare** 535

## **6. Basic Principles and Present Provisions** **of the Medicare System** 537

*Basic Principles of the Medicare System: Basic Nature of HI. Basic Nature of SMI. Excluded Services. Hospital Insurance Provisions: Eligibility Conditions. Benefit Provisions. Reimbursement Provisions. Financing Provisions. Supplementary Medical Insurance Provisions: Eligibility Conditions. Benefit Provisions. Reimbursement Provisions. Financing Provisions. Administration of Medicare: Role of the Federal Government. Role of HI Fiscal Intermediaries. Role of SMI Carriers. Controls on Hospitals. Controls on Physicians (As to Quality and Quantity of Services).*

## **7. Development of the Medicare System** 591

*Early Legislative Efforts: Legislative Proposals before 1935. Legislative Proposals between 1935 and 1950. Legislative Action in 1951–1964. Enactment of Medicare: Administration Proposal in 1965. Other Proposals in 1965. Action of the House of Representatives in 1965. Action of the Senate in 1965. Action of the Conference Committee in 1965. Changes in Medicare since 1965: Considerations and Ac-*

## xvi Contents

*tions during the Johnson Administration. Considerations and Actions during the Nixon Administration. 1975 Legislative Proposals of Ford Administration. 1975 Advisory Council. Developments in 1975–1980. Recommendations of National Commission on Social Security. Legislative Developments in 1980–1984. 1984 Advisory Council. Medicare Catastrophic Coverage Act of 1988. Legislative Developments After 1984 Other than MCCA. 1991 Advisory Council. Promulgated Medicare Elements.*

### *Appendixes*

- 7-1. Legislative Development of Medicare Provisions in the 1967 Act 637
- 7-2. Changes in the Medicare Program Considered in 1970–1972 but Not Adopted 640
- 7-3. Changes in the Medicare Program Made by the Bill Passed by the Senate in 1973 but Not Enacted 641
- 7-4. Change in the Medicare Program Made by the Bill Passed by the Senate in 1983 but Not Enacted 642

## **8. Medicare Financing Principles and Provisions 643**

*HI Financing Principles: Individual-Equity Concept. Financing and Investment Procedures. Allocation of Costs among Contributors. Self-Supporting Principle. HI Financing Provisions: Tax Rates. Determination of Premium Rates for Voluntary Coverage. Interrelationship of Hospital Insurance and Railroad Retirement. SMI Financing Principles: Premium-Rate Basis. Financing and Investment Procedures. SMI Financing Provisions: Determination of Premium Rates. Collection of Premiums.*

### *Appendixes*

- 8-1. Methodology for Long-Range Hospital Insurance Cost Estimates 669
- 8-2. Methodology for Short-Range SMI Cost Estimates 675
- 8-3. Provisions for Temporary Government Guarantee of Solvency of SMI Trust Fund 678
- 8-4. Past History of Promulgations of SMI Standard Premium Rates 679

## **9. Possible Future Development of the Medicare Program 685**

*Expansion of the Medicare Program: Coverage of Additional Types of Beneficiaries. Coverage of Unemployed Workers. Coverage of Specific Catastrophic-Cost Cases. Resurrection of Catastrophic Health Benefits Proposals. Coverage of Additional Medical Services. Long-Term-Care Benefits. Modification of Reimbursement Basis. Restructuring the Medicare Benefits Package. Revised Financing of Medicare Program: Introduction (or Increase) of Government Subsidy. Direct-Financing*



*Provisions. Increased Cost-Sharing. National Health Benefit Proposals: Views of Supporters of National Health Insurance. Views of the Public on National Health Insurance. Developments Following Enactment of Social Security Act. Developments Following Enactment of Medicare. NHI Proposals during 1972–1975. NHI Proposals in 1975–1978. NHI Proposals in 1979–1980. Action in Early 1980s. Catastrophic Health Benefit Plans in Lieu of NHI. Resurrection of NHI Proposals. Hawaii Health Insurance Program.*

## 10. Actuarial Cost Estimates and Analysis and Statistical Information for OASDI and Medicare 722

Actuarial Cost Estimates Made at the Enactment of the 1977 and 1983 Amendments: *Year-by-Year Costs. Progress of the Trust Funds. Actuarial Balances. Actuarial Cost Estimates from the 1992 Trustees Reports: Year-by-Year Costs. Progress of the Trust Funds. Future Fund Ratios. Historical Summary of Actuarial Balances. Projections of Covered Workers and Beneficiaries. Effect of Varying Economic and Demographic Assumptions for OASDI Cost Estimates: Effect of Varying Assumptions in 1974 Estimates. Effect of Varying Economic Assumptions in 1992 Estimates. Effect of Varying Demographic Assumptions in 1992 Estimates. Past Operations: Data on OASDI Coverage and Benefits Experience. Data on Medicare Coverage and Benefits Experience. Data on Operations of Trust Funds. Amount of Life Insurance under OASDI.*

### *Appendix*

10-1. Actuarial Cost Estimates and Statistics for OASDI and Medicare 761

## Part Four Allied Programs 795

### 11. Public Assistance Programs 797

Cash-Assistance Programs for Adults: *Supplemental Security Income Program. Energy Assistance. Housing Assistance. Aid to Families with Dependent Children: Financing of AFDC. Statistics of Operation. Medicaid: Medical Assistance for the Aged. Enactment of Medicaid. Characteristics of Medicaid. Financing of Medicaid. General Assistance. Proposed Family Assistance Plan. Relationship between Public Assistance and Social Insurance Programs: General Relationship Principles. Data with Regard to the Relationship between Public Assistance and OASDI.*

### *Appendixes*

11-1. Public Assistance Programs before the Social Security Act 823

11-2. Development of Federal-State Public Assistance Programs 826

**xviii Contents**

**12. Railroad Retirement System 833**

Early Pension Developments. Initial Government Action. Coverage Provisions. Current Retirement and Disability Benefit Provisions: *Eligibility Conditions. Monthly Beneficiary Categories and Rates. Retirement and Disability Benefit Amounts. Spouse Benefit Amounts. Monthly Survivor Benefit Amounts. Other Survivor Benefits. Current Financing Provisions.* Supplemental Annuity System. Commission on Railroad Retirement Reform.

*Appendixes*

12-1. Outline of the Benefit and Financing Provisions of the Railroad Retirement System as Amended through December 31, 1990	851
12-2. Operational Data for the Railroad Retirement System	864
12-3. Actuarial Basis of the Railroad Retirement System	866
12-4. Development of Financing Provisions of the Railroad Retirement System	868

**Appendixes**

*Appendix A*

Definition of Social Insurance Developed by the Committee on Social Insurance Terminology of the Commission on Insurance Terminology of the American Risk and Insurance Association	877
---	-----

*Appendix B*

Views on Individual Equity and Social Adequacy	878
--	-----

*Appendix C*

Presidential Statement upon Signing the Social Security Act, August 14, 1935	880
--	-----

*Appendix D*

Reporting and Promulgation Dates Specified by Law for the Old-Age, Survivors, and Disability Insurance and Medicare Programs	882
--	-----

*Appendix E*

Funding Ratios as OASDI and Medicare Triggering Devices	884
---	-----

*Appendix F*

Summary of Recommendations of the Social Security Technical Panel to the 1991 Advisory Council on Social Security	888
---	-----

*Appendix G*

Summary of Recommendations of the Health Technical Panel to the 1991 Advisory Council on Social Security	891
--	-----

*Appendix H*

Presidential Statement upon Signing the Social Security Amendments of 1983, April 20, 1983	893
--	-----

Selected Bibliography	897
Index of Persons and Organizations	915
Index of Subjects	919

## Chapter 4

### **Financing Basis of the OASDI System**

---

As indicated previously, the Old-Age, Survivors, and Disability Insurance (OASDI) system derives its primary financing from a specific contribution (or tax) schedule contained in the law. What might be called secondary financing comes from interest earnings on the accumulated funds and the proceeds from income taxes levied on OASDI benefits. Before 1983, Congress frequently expressed its intent that the system should be self-supporting—insofar as indicated by the best available actuarial cost estimates—from contributions and interest earnings, without any contributions or subsidies from the General Treasury.

In this respect, it should be noted that interest earnings from the trust funds are not subsidies (as is sometimes incorrectly stated by some critics of the program and as discussed later). Likewise, this is the case for the contributions payable with respect to the wages paid by the federal government to its covered employees (such as temporary workers, new hires after 1983, and the military forces), because these are really “employer” contributions.

It is of some interest to note that, although the OASDI system is primarily financed by payroll taxes (or contributions), the payment of the tax is not an absolutely necessary condition for crediting earnings in covered employment toward benefit eligibility and amounts. Such earnings are creditable regardless of whether the taxes were paid, although in virtually all cases tax payment does occur when there are covered earnings. The only exception to such linkage of benefits and taxes occurs when an employer goes bankrupt or otherwise does not pay the required taxes.

The possibility of a government subsidy to OASDI increased con-

siderably after 1975, as a result of its financial problems and then the increased payroll taxes introduced to alleviate such problems. In 1977, President Carter proposed, as part of his recommendations for restoring the financial integrity of OASDI, that a "temporary" government subsidy be introduced to compensate the OASDI system for the lower tax receipts during 1975–78 due to the high unemployment rate then.<sup>1</sup> However, both the House Ways and Means Committee and the Senate Finance Committee rejected this proposal, and it was not contained in the 1977 Act.

Shortly after the 1977 Act was enacted, a sizable public outcry arose over the large future tax increases legislated (especially those resulting from the ad hoc increases in the maximum taxable earnings base in 1979–81). In response, many proposals were made by members of Congress to roll back or otherwise reduce the effects of the higher Social Security taxes.<sup>2</sup> For some time, the tide ran high for such action. However, with opposition from the Carter administration and the chairmen of the two congressional committees responsible for OASDI legislation, the movement peaked and ebbed, and no changes in the future tax provisions were made.<sup>3</sup>

As has been indicated in Chapters 2 and 3, general-revenues financing (or government subsidies) was injected into the OASDI system by the 1983 Act, albeit in a somewhat indirect or hidden manner. One such action was a one-time affair—in connection with proceeds from the increase in the 1984 employee tax rate not coming from the employees, but rather from the General Fund. The other such action was an ongoing matter—levying income taxes on the OASDI benefits of high-income persons and then giving the proceeds to the OASDI

1. For a more complete description of the proposal and a criticism that the procedure did not, by any means, produce amounts of government subsidy equal to the taxes "lost" by unemployment being high, see Robert J. Myers, "Okun's Law and the Carter Social Security Proposals," *Journal of Risk and Insurance*, June 1978.

2. For a description of the various proposals made and a discussion of the general events underlying them, see Robert J. Myers, "Social Security Funding," *Record, Society of Actuaries*, April 1978.

3. Under pressure from the Democratic Caucus of the House of Representatives, the Ways and Means Committee developed a bill (H.R. 12736) that would have rolled back the taxes for 1979–80. The OASDI-HI tax rate would be rolled back to the rate of 5.85 percent prevailing in 1977 (i.e., lower than the rate that had been scheduled for 1979–80 under the law as it was before the 1977 Act), and the earnings base would be reduced by \$1,000 in 1979 and \$2,000 in 1980 (i.e., to \$21,900 and \$23,900, respectively). At the same time, the tax rates would be reallocated between OASDI and HI so that the former would receive the same income as under the 1977 Act. The resulting decreases for HI would be made up by a government subsidy. However, when the committee voted on whether to report the bill to the House on May 17, 1978, it was rejected by a vote of 21 to 16 (largely because of the opposition of Chairman Al Ullman).

Trust Funds (and, in fact, somewhat in advance of when the income taxes are paid!).

Certain other payments to the OASDI Trust Funds from the General Fund authorized by the 1983 Act are not really "government subsidies." These are the immediate payment for military-service deemed wage credits for service rendered in the past, the current payment for future military service as rendered, the portion of the self-employment taxes that represents the reduction in income taxes if the person had incorporated the business, and the monthly advance payroll tax transfers. The reasons why these are not really government subsidies are given in Chapter 3.

As for what action will be taken in the future with regard to injecting any further government subsidy into the OASDI system, it is indeed impossible to predict with any hope of accuracy. Some congressional leaders have consistently and strongly opposed such procedure. The Carter administration first urged this and then later opposed it.

Many of those with the expansionist philosophy strongly support the concept of a government subsidy—at least initially, for the HI program (perhaps later extending to OASDI). Such subsidy could be direct and visible, such as being 50 percent of the payroll-tax receipts (i.e., resulting in so-called equal tripartite financing, which some have proposed in the past). Another direct method would be to put the proceeds from earmarked taxes (such as on tobacco and alcoholic products) in the trust funds. Although of assistance in the financing of the system, this would not be a very predictable source.

Indirect—but still very real—subsidy could be achieved in several ways, such as increasing the employee tax rate, but giving a full refundable tax credit therefor. This was done for 1984 under the 1983 Act and was proposed for certain future years by the congressionally appointed Democratic members of the National Commission on Social Security Reform in 1982–83.

To understand more fully the financing basis of the OASDI system, examination must be made first of such broader points as why a fund develops and the concept of actuarial soundness as it applies to social insurance. Then the specifics of the actuarial basis of the system as it has developed over the years and as it is now may be considered. As related matters, consideration can be given to the relationship of the funds and the general budget, and to investment procedures, including the interest basis of the investments and possible alternative approaches. Finally, this chapter considers the relationship between the OASDI and Railroad Retirement systems with regard to the financial-

interchange provisions, which integrate the financing of the two programs.

Appendix 4-1 describes in considerable detail the methodology underlying cost estimates for social security programs of all types. Such cost estimates are essential in determining the financing bases of such programs. Particular emphasis is placed on the methodology for the cost estimates for OASDI.

### **Why a Fund Develops**

Under almost any pension system, the cost of the benefits will increase for many years after the program is inaugurated. Many factors can produce this result, but not all the factors are present in every instance. Among such factors are (1) the increasing proportion of the aged in the population (almost entirely as a result of the maturing population and the continually lower mortality at all ages in the past), (2) the greater proportion of younger persons than of older persons covered when the system was established (partly because of the omission of all or some of the current aged who were already retired), and (3) the basing of benefits to a greater or lesser degree on the length of time that contributions are made (so that benefits in the early years of operation are smaller than those that will be paid ultimately).

#### *Financing by Level Rate*

If the rising benefit cost is to be met by a level contribution rate, contribution receipts in the early years of operation will exceed benefit disbursements, and thus a fund will be built up. After the early years (or perhaps decades) of operation, the reverse situation will occur. If the system is in "actuarial balance," with the level contribution rate properly and precisely determined, interest on the fund that is developed in the early years will meet the excess of benefit disbursements over contribution income in the later years.

#### *Financing by Increasing Schedule of Rates*

As an alternative to financing a pension plan with a level contribution rate, a schedule providing for a lower rate in the early years and a series of increases thereafter can be used. The ultimate rate under such a schedule will, of course, have to be higher than the level rate mentioned previously. The size of the fund that develops will depend on the gradation of the contribution schedule. If there were very little

gradation (that is, if the initial rates were only slightly below the level rate, and if the ultimate rate were attained in a short time and accordingly were very little higher than the level rate), then the developing fund would be almost as large as under the level-rate basis.

At the other extreme, if the contribution schedule started out very low and rose very slowly, but ultimately to a fairly high level, virtually no fund would be developed, and yet the system would be in actuarial balance. In fact, this situation—in which the contributions are determined, to all intents and purposes, so that they equal the estimated benefit payments in each future year—is one form of “pay-as-you-go” financing. That term also applies to a situation that involves no definite benefit commitments but, instead, paying whatever benefits would be possible with the prescribed contribution income or, conversely, raising whatever money would be necessary to meet benefit obligations determined in advance.

#### Financing by Decreasing Schedule of Rates

An infinite number of variations in the contribution schedule are, of course, possible such that, under the assumptions made, a self-supporting system would result. As still another alternative, plans can be financed by having higher contribution rates in the early years and lower ones thereafter. This procedure naturally produces a larger fund than financing with a level rate.

Such a procedure is fairly common in financing private pension plans. Both the accrued liability for service performed before the inception of the plan (or for any liberalization of the plan that is made later) and the additional cost arising from the fact that the initial group has a higher average age than future new entrants can be financed by amortization over a period of years.<sup>4</sup> After this time, the contribution rate would be relatively low—at the level necessary for new entrants entering at the younger ages. Furthermore, at such time the system would be fully funded and meet the most rigid definition of actuarial soundness (discussed in some detail later). Thus, the assets on hand would be sufficient to meet all the benefit obligations that have accrued. If the system were to be terminated, both as to collection of contributions in the future and to crediting of future service, the accrued benefit obligations could be met only if the computations had assumed no discounting for gains from future with-

4. In theory, these liabilities could be paid off in one initial lump sum, but in practice this procedure is not followed, if for no other reason than tax considerations.



drawals or for deferred retirements (and, of course, also if all other actuarial assumptions were realized).

#### Pros and Cons of Increasing Schedule of Rates

It may be noted further that, if by reason of the provisions of the plan, the cost of the benefits does not rise sharply in the future, the resulting fund, even with a level contribution rate, will be much smaller than under a plan that has a sharply rising benefit cost. In fact, if a plan is developed under which the benefit cost (related to payroll) would be the same for every future year, then obviously the corresponding level contribution rate would just meet the benefit disbursements each year, and no fund would develop.

One disadvantage of having an increasing contribution rate under a plan with contributions from the participants is that those who retire in the early years of operation do not pay as high a rate for the benefits they receive as do those who retire in subsequent years. Even with a level contribution rate, those who retire in the early years usually receive far more in benefits than their contributions would have purchased on an actuarial basis. Through one method or another, they receive credit for service performed before the inception of the plan. Accordingly, only a small portion of their benefit is "purchased" by their contributions. This procedure is customary under both private pension plans and social insurance. Otherwise, if benefits were related to contributions made or to length of service after the plan began, inadequate pensions would be provided for the first few decades of operation of the system. Accordingly, the program would not really be serving the purpose for which it was established.

Another problem arising with increasing contribution rates is that ultimately the employee rate (particularly if the employer and employee rates are equal) may be higher than individual equity would suggest—that is, the young entrants would be able to purchase more protection with their own contributions from an insurance company than is furnished under the social insurance system. If this happened, one possible solution would be to lower the ultimate contribution rates and make up the difference by a government subsidy to the system in the later years of operation. On this basis, there could be graded contribution rates starting at a low level, with the employee rates not rising above the individual-equity level. At the same time, a relatively small fund would be built up. This solution would involve an ultimate government contribution or subsidy.

Alternatively, if the employer contribution rate were significantly

higher than the employee rate, it is likely that the latter would never rise beyond the individual-equity level. Of course, if there is also a government contribution to the system (especially if it is at least equal to half the combined employer-employee rate, as is the case in some systems), then it is even more unlikely that the ultimate employee contribution rate under a graded schedule would ever exceed the individual-equity level.

Despite the foregoing discussion, it may be argued that, even if the ultimate employee contribution rate does exceed the rate actuarially equivalent to the value of the benefit protection, there is no necessity for a government subsidy to prevent this result. For one thing, such a subsidy would have to be financed by general taxes, and the burden would fall, to a considerable extent, on the same people whose contribution rate would be lowered. Also, under social insurance, there is really no absolute need for strict individual-equity considerations to prevail.

### Concept of Actuarial Soundness

In discussions of any type of long-range benefit program, the phrases *actuarial soundness* and *actuarially sound* occur from time to time. Essentially, these phrases relate to the ability of the given plan to provide the benefits established. Many different definitions may be given in the absence of any strict legal requirements (as, for instance, is the case for reserve requirements for life insurance and annuity reserves of insurance companies). For noninsured pension plans, there tends to be a somewhat broader range of definitions. For social insurance plans, the range is even broader.

#### Definition of Actuarial Soundness

At perhaps one extreme for private pension plans might be the definition that a plan is actuarially sound if the fund on hand is large enough to pay all future benefits for those currently on the roll. In other words, no allowance is made for the accrued benefit rights of those not yet retired. At the other extreme is a plan under which the existing fund is sufficient to pay for all benefit rights accrued to date. This basis would be somewhat difficult to attain for a newly organized plan that assumed considerable liabilities on account of past service. Accordingly, some actuaries define an actuarially sound plan as one

where the employer is well informed as to the future cost potential and arranges for meeting those costs through a trust or insured fund on a scientific,

orderly program of funding under which, should the plan terminate at any time, the then pensioners would be secure in their pensions and the then active employees would find an equity in the fund assets reasonably commensurate with their accrued pensions for service from the plan's inception up to the date of termination of plan.<sup>5</sup>

This definition permits a long time to elapse before all the past-service credits are fully funded.

Other actuaries have a somewhat less stringent definition of an actuarially sound system:

One which sets forth a plan of benefits and the contributions to provide these benefits, so related that the amount of the present and contingent liabilities of the plan as actuarially computed as of any date will at least be balanced by the amount of the present contingent assets of the plan actuarially computed as of the same date.<sup>6</sup>

#### Application of Concept to OASDI

How do these concepts of actuarial soundness apply to the OASDI system? According to the first definition, this program is not actuarially sound; according to the second definition, it is if the test of long-range actuarial balance (described later) is met. Acceptance of the basis of the first definition, however, does not mean that the converse is true—that the system is actuarially unsound and therefore, by implication, is bankrupt. Rather, the author of the first definition stated in the same paper that he did not “see any point in rigorously applying actuarial reserve techniques to a broad national system. Such a system transcends ‘actuarial soundness’ criteria of the usual kind. What purpose would be served if reserve assets in the actuarial amount of \$150 billion were now on hand? They would not be used; the system is not going to terminate, calling on a liquidation of the reserve for benefits.”

Even though it is generally agreed by actuaries that the first and more restrictive definition of actuarial soundness does not apply to OASDI, it may be of interest to present certain quantities pertinent to it.

5. Dorrance C. Bronson, “Pension Plans—The Concept of Actuarial Soundness,” *Proceedings of Panel Meeting: “What Is Actuarial Soundness in a Pension Plan?”* sponsored jointly by the American Statistical Association, the American Economic Association, the American Association of University Teachers of Insurance, and the Industrial Relations Research Association, Chicago, December 29, 1952.

6. George B. Buck, “Actuarial Soundness in Trusteed and Government Retirement Plans,” *Proceedings of Panel Meeting*, *ibid.*

### Deficit for Present Members

Such calculations can readily be made, and this has been done by the Social Security Administration on an appropriate basis, even though its actuaries recognize that the resulting figures can be misunderstood and misused—and, in fact, have no real significance for a social insurance system.

One concept of measuring the actuarial condition of a pension plan is to develop the “deficit for present members.” This merely means the amount required at the present time that, together with the existing fund and the present value of future contributions from present members, will support future benefits for those on the roll, for present active members and their survivors, and for survivors of previously deceased members who have not reached the minimum eligibility age for survivor benefits. In other words, this is a “closed-group” concept, under which the system would be continued for present members but would have no new entrants and no employer contribution income for new entrants.

The situation for the OASDI program under this closed-group concept is shown in Table 4.1 for various past years.<sup>7</sup> Corresponding data on an “open-group” basis for a 75-year future period are also prepared and are presented subsequently in Table 4.5. No such closed-group data are prepared for the HI system.

Under this concept, the actuarial deficit was \$433 billion in mid-1971, or about 11 times the amount of the then-existing trust fund. The actuarial deficit one year later was much larger—\$1,865 billion (i.e., almost \$2 trillion), or 42 times the amount of the then-existing trust fund. This astounding figure resulted largely from changing the cost-estimating methodology, by using dynamic economic assumptions for earnings levels and price levels (which, in turn, affect benefit levels). The actuarial deficit in mid-1973 rose by 14 percent—resulting from the notable liberalizations in the October 1972 amendments—to \$2,118 billion, or 48 times the amount of the then-existing trust fund. The actuarial deficit as of mid-1974 rose by 16 percent—largely as a result of the 11-percent benefit increase—to \$2,460 billion, or 53 times the amount of the then-existing trust fund.

7. Section 402, Public Law 89-809 requires that the Treasury Department report to Congress with regard to all unfunded accrued liabilities of the U.S. government, including those under OASDI. Under the closed-group concept used, it is assumed that persons under some young age (such as age 15) on the valuation date will not have any earnings credits in the future and that benefit payments for *all* future years will be taken into account. These data as to the total deficit have been published in the March issues of the *Treasury Bulletin* in recent years.

TABLE 4.1. Actuarial Status of OASDI on a "Closed-Group" Basis, 1971-91  
(dollar figures in billions)

Year*	Interest Rate Basis†	Present Value of		Existing Trust Fund	Net Deficit‡
		Future Outgo	Future Taxes		
1971	5.25%	\$ 1,044	\$ 570	\$41	\$ 433
1972§	6.0	2,859	950	44	1,865
1973	6.0	3,231	1,068	44	2,118
1974	6.0	4,025	1,519	46	2,460
1975	7.38	4,282	1,524	48	2,710
1976	6.6	5,876	1,684	44	4,148
1977 (pre-1977 Act)	6.6	7,563	2,161	40	5,362
1977 (1977 Act)	6.6	6,184	2,688	40	3,456
1978	6.6	7,066	3,060	35	3,971
1979	6.6	7,490	3,232	33	4,225
1980	6.08	10,042	4,409	32	5,601
1981	6.08	10,345	4,459	27	5,858
1982	6.08	10,037	4,210	19	5,808
1983	6.08	10,022	4,931	32	5,059
1984	6.08	9,092	4,852	32	4,208
1985	6.08	9,795	5,108	40	4,647
1986	6.08	11,335	5,895	46	5,394
1987	6.08	11,795	6,150	65	5,580
1988	6.08	12,162	6,318	104	5,740
1989	6.08	13,027	6,772	157	6,098
1990	6.08	14,943	7,608	215	7,121
1991	6.39	14,328	7,465	268	6,595

\* As of June 30 for 1971-75 and as of September 30 for 1976-91.

† A somewhat higher rate than that shown is used for the first few years.

‡ Excess of present value of future outgo over the sum of present value of future taxes and existing trust fund.

§ Includes the effect of the 20-percent benefit increase enacted on July 1, 1972 (effective for September 1972).

The estimated actuarial deficit continued to increase as a result of more conservative assumptions being introduced about fertility, mortality, and economic trends of wages and prices. The last-mentioned factor was the most important in this respect. The law before the 1977 Act resulted in a deficit of \$5.4 trillion as of September 30, 1977, but this would have been reduced by 36 percent, to \$3.5 trillion, if the provisions of the 1977 Act had been in effect.<sup>8</sup> The deficit increased in 1978-80, reaching \$5.6 trillion as of September 30, 1980; this resulted primarily from the economic assumptions about higher wages

8. Note that the decrease is greater (namely, 83 percent) when the analysis is made on the open-group basis, as discussed later (see Table 4.5).

and prices and their rates of increase over the short term. The sharp rise from 1979 to 1980—from \$4.2 trillion to \$5.6 trillion—resulted primarily from using a lower valuation interest rate—6.08 percent (based on a real interest rate of 2 percent, combined with a long-term inflation rate of 4 percent), as against 6.6 percent previously (based on a real interest rate of 2½ percent, again combined with an inflation rate of 4 percent). Also contributing to the rise was the changed definition of the closed group—persons aged 15 and over on September 30, 1980, versus persons aged 19 and over on September 30, 1979.

In 1981 and 1982, the deficit rose to about \$5.8 trillion. However, it was reduced to \$5.1 trillion as of September 30, 1983, as a result of the increased income from payroll taxes and the income taxation of benefits and as a result of the reduction in the growth of benefit outgo under the 1983 Act (which, however, insofar as the present value of future outgo is concerned, only prevented a sizable increase that would otherwise have occurred). The increase in the Normal Retirement Age as a result of the 1983 Act had only a small effect, because it will not become fully effective until about 45 years after the valuation date.

In 1984, the deficit was shown as \$4.2 trillion. However, in each subsequent year thereafter through 1990, deficit increases occurred (as a result of the assumptions being revised and producing higher costs—see Appendix 4.1 and also Table 10.11). Thus by 1991 the deficit stood at \$6.6 trillion (a decrease from the 1990 figure of \$7.1 trillion, primarily because of the higher interest rate used for discounting purposes).

#### Normal-Cost Basis

A somewhat different concept of unfunded accrued liability for present members is frequently used in connection with private pension plans. Such liability is defined as the excess of the present value of future benefit payments and administrative expenses with respect to present members over the sum of current assets as of the valuation date and the present value of future contributions for present members at the normal-cost rate (i.e., the rate computed to be sufficient for new entrants). The only difference between this approach and the one discussed previously is that, under the previous approach, the contribution rates used are those scheduled in the law, rather than the normal-cost rate.

On this basis, as of the beginning of 1979, the normal cost was determined to be 13.72 percent of taxable payroll (for the cohort aged

19–23 then), and the unfunded accrued liability was \$3,734 billion.<sup>9</sup> As would be anticipated (because the normal cost is higher than the scheduled combined employer-employee tax rates), this is less than the \$3,971 billion as of September 30, 1978, under the basis using the scheduled tax rates for the present closed group.

If OASDI were financed under the general basis that many private pension plans are—that is, normal cost plus amortization of the unfunded accrued liability over a period of years—the results would be astounding. Suppose that the unfunded accrued liability were funded over 30 years by a level percentage of payroll. (ERISA used a period of 40 years for past-service liabilities for plans in existence in 1976 and 30 years for newly created liabilities of such plans and for new plans; ERISA also required uniform dollar amounts for the amortization each year, which in an inflationary or dynamic economy seems less logical than a “level percentage of payroll” basis, at least for a government plan.)

On such funding basis, the required combined employer-employee OASDI tax rate under the situation as it was in 1979 would have had to be 24.40 percent for the next 30 years and then the normal-cost rate of 13.72 percent (for 75-year amortization, the corresponding figures would be 18.35 percent and 13.72 percent). The result, of course, would be a huge buildup of the OASDI Trust Funds. The ratio of the fund balance at the beginning of the year to the outgo during the year would rise to about 36 (i.e., 3600 percent) in 2010, but then it would decrease and level off at 28 in 2030 and thereafter.

#### Valuation of Benefits in Current-Payment Status

Still another concept of actuarial soundness applicable to private pension plans may be considered with respect to the OASDI system—namely, the present value of all benefits in current-payment status. In a sense, this corresponds to the terminal-funding concept of private pension plans.

At the end of 1979, benefits in current-payment status were being paid at a rate of \$9,108 million a month. These had a present value at 2½ percent interest of \$1,033 billion—about 34 times the then-existing trust-fund balance (from Actuarial Study No. 80, Social Security Administration). Based on the relationship of the benefits in current-payment status and their present value, the corresponding figure at the end of 1990 was a present value of \$2,450 billion, or 11

9. These data are from Joseph A. Applebaum, *Some Effects of Fully Funding OASDI*, Actuarial Note No. 97, Social Security Administration, September 1979.

times the then-existing trust-fund balance of \$225 billion. (An interest rate of 2½ percent is proper, because this takes adequate account of the automatic adjustments for increases in the CPI.) But it should be kept in mind that this relationship has no direct bearing on the actuarial soundness of the program, although it is an interesting summary measure of the obligations incurred and facilitates comparisons with other systems.

#### Views of an Economist

Paul A. Samuelson, a well-known economist from the Massachusetts Institute of Technology, expressed some rather unique and startling views on the concept of actuarial soundness as it applies to OASDI and on the financing of OASDI in his column in *Newsweek* on February 13, 1967, where he stated in regard to that program:

The beauty about social insurance is that it is *actuarially* unsound. Everyone who reaches retirement age is given benefit privileges that far exceed anything he has paid in. And exceed his payments by more than ten times as much (or five times, counting in employer payments).

How is this possible? It stems from the fact that the national product is growing at compound interest and can be expected to do so for as far ahead as the eye can see. Always there are more youths than old folks in a growing population. More important, with real incomes growing at some 3 percent per year, the taxable base upon which benefits rest in any period are much greater than the taxes paid historically by the generation now retired.

Dr. Samuelson was in error in his understanding of the concept of actuarial soundness as it applies to OASDI, because he seemed to believe that this term was equivalent to full-reserve financing. But even more important, he erred in believing that OASDI possessed a Ponzi-type magic machine involving economic perpetual motion. Less than a decade passed before conditions were such that both continuous population growth and economic expansion due to increasing productivity no longer seemed likely.

#### Length of Valuation Period

Under the open-group concept, the length of the valuation period is very important. Ideally, from a purely actuarial viewpoint, such period should be infinite, but laymen sometimes have difficulty in understanding how level costs can be derived on this basis.<sup>10</sup> Accord-

10. For example, it is quite possible to obtain a finite figure for the present value of an infinite series of figures. Specifically, the present value at 5 percent interest of a



ingly, such valuations are often limited to a fixed, but long, period. Obviously, if the period were quite short, the costs would not be properly portrayed. However, as will be discussed later, the use of even as long a period as 75 years has some limitations with respect to the financing and actuarial bases of OASDI.

#### Pay-As-You-Go Financing

Finally, the question may be raised whether a long-range social insurance system with pay-as-you-go financing (defined to mean that annual receipts and annual disbursements are approximately in balance) could ever be considered actuarially sound. It could not, of course, under the first definition of actuarial soundness. Under the second definition, however, such a program could be actuarially sound if a gradually rising contribution schedule were determined to approximate closely the estimated future disbursements year by year.

Regardless of whether the concept of actuarial soundness in its usual meaning can be applied to the OASDI system, there must be thorough actuarial analysis and cost estimates for the program—essential factors in considering and determining its long-range benefit structure.

### Actuarial Basis of OASDI

#### Original Law

The 1935 legislation did not provide for any government contribution or subsidy to the system, even though this had been the recommendation of the presidential committee that had studied the matter.<sup>11</sup> The cost estimates indicated that the system would be self-supporting from the contributions of employers and employees.

There was—and still is—considerable misunderstanding of the financing basis adopted originally. Many people believed that a full

---

series of payments of \$1 at the end of every year forever is \$20. This can readily be seen in reverse, by viewing a deposit of \$20 which is never touched but yields interest of \$1 per year (at 5 percent).

11. Actually, the Committee on Economic Security recommended that equal employer and employee contribution rates should be provided, beginning at  $\frac{1}{2}$  percent each in 1937 and rising by  $\frac{1}{2}$  percent every five years until leveling off at  $2\frac{1}{2}$  percent in 1957 and thereafter. For several years after 1957, the fund was estimated to increase, reaching a peak of \$15 billion in 1965. At that point, a government subsidy would be introduced, in an amount sufficient to keep the fund from decreasing. It was believed that such subsidy would, by 1980, be about 67 percent of the combined employer-employee taxes.

actuarial reserve system was being developed, especially since the estimated ultimate fund of \$47 billion in 1980 seemed so large—slightly greater than the national debt in 1935.<sup>12</sup> Such was not the case, however, because the cost estimates showed the system to be self-supporting only when it was considered as operating into perpetuity. At any particular date, the fund available would by no means be sufficient to meet the accrued liabilities without the help of the scheduled future contributions. Interestingly, the fund was shown as building up steadily in the valuation period (1937–80) and leveling off thereafter; both income and outgo were estimated at \$1.40 billion in 1980.

Other evidence that the original act was not on a so-called full-reserve, actuarial basis can be found from the benefit structure. A worker retiring at age 65 at the beginning of 1942 (the earliest possible date under the 1935 Act) with typical earnings of \$1,000 per year would have contributed \$60 (with the employer paying the same amount) and would have received a monthly benefit of \$16.67. Thus, in four months, more would have been received in benefits than had been paid in taxes—hardly an actuarial, individual-equity plan!

#### 1939 Act

The 1939 Act changed the financing basis to what was generally believed to be a pay-as-you-go basis or, more properly, a contingency-fund basis. The Social Security Advisory Council of 1937–38 recommended the development of a relatively small contingency fund, with eventual government contributions. However, the 1939 Act did not specifically adopt this recommendation, and the program has not developed in this pattern. The 1939 Act “froze” the tax rate for the three years 1940–42 at the initial level (2 percent for employer and employee combined), and subsequent congressional action continued this freeze throughout the 1940s. This action further strengthened the belief of many persons that the system was being financed—or would be financed—on a pay-as-you-go basis, despite the fact that because of the economic situation due to the war, income was very

12. Interestingly, the combined OASDI Trust Funds reached \$47.0 billion in April 1975. The balance then rose to a peak of \$48.6 billion on May 31, 1975. Following this, the balance decreased steadily, reaching \$12.3 billion at the end of 1983 (net of the loan from the HI Trust Fund). The fact that the balance grew to a level so close to the original estimate of \$47 billion made in 1935 was, of course, largely a coincidence due to a number of counterbalancing items! After 1983, the fund balance steadily increased and amounted to \$225 billion at the end of 1990; in terms of 1935 dollars, however, this was only \$23 billion—a far cry from the famous figure of \$47 billion in 1980 under the 1935 Act.

considerably in excess of outgo, and a sizable fund had accumulated. In fact, however, the program remained on the same funding basis—partial-reserve financing—on which it had been originally, although it was moving more toward pay-as-you-go financing. Also, smaller fund accumulation was anticipated, in large part because benefit outgo had been increased in the early years of operation and decreased in the later years by the 1939 Act.

No specific provision was made in the 1939 Act for any government subsidy, although, according to some individuals, a contingency-reserve financing approach had been adopted. However, the 1943 legislation that continued the 2-percent employer-employee tax rate incorporated a provision authorizing appropriations to the trust fund from general revenues, if needed to finance the program. No appropriations were made under this provision, because the trust fund grew rapidly, and none seemed to be required.

#### 1947–48 Advisory Council

The Social Security Advisory Council of 1947–48, somewhat paralleling the action of the previous advisory council, recommended a financing basis under which a relatively small contingency fund would develop, with eventual government contributions (or subsidies) equal to half the combined employer-employee taxes. This advisory council also recommended an immediate increase in the contribution rate, despite the fairly sizable fund that was continuing to develop. This action was based in large part on “psychological” rather than actuarial grounds, so that the general public would realize that the considerably liberalized benefits recommended meant additional costs and consequently higher contribution rates.

#### 1950 Act

Congress, in enacting the 1950 Act, did not concur with the financing recommendations made by the advisory council, but instead quite clearly and strongly expressed the intent that the system be completely self-supporting from the tax income provided. This basis was maintained until the 1983 Act (although, as discussed previously, it was seriously threatened in the early part of 1978, when there was considerable public outcry against the prospective high taxes under the 1977 Act). The tax schedule has been revised from time to time as additional benefits have been provided and in accordance with the needs indicated by revised actuarial cost estimates.

Until the 1972 Act, the self-supporting principle was implemented by having an upward-graded tax schedule that reached its ultimate level in a few years. Frequently, the scheduled increases were not put fully into effect when the time for them came, but rather they (and subsequent scheduled increases as well) were postponed at least in part for a few years.

One reason for the approach of grading up the tax schedule rapidly, with the ultimate rate coming within a few years, was that then such ultimate rate would not have to be as high (and thus not disturb the public as much) as it would have been if it were long deferred. For example, consider a simplified example of taxable payrolls being constant in all future years and with a trust-fund interest rate of 5 percent. Suppose that a tax schedule of 6 percent rising to 10 percent in three-year steps of 2 percent each were desired to be stretched out to have the ultimate rate occur 30 years hence (instead of 6 years) with equal steps every decade. Then such steps would have to be 2.63 percent each, and the ultimate rate would be 13.89 percent.

An illustration of how this basis worked out can be found by considering the situation as it was at the time of enactment of the 1971 Act. The OASDI tax schedule would reach its ultimate level in a few years (1976), while benefit disbursements would increase for a number of decades. In accordance with the self-supporting financing basis of OASDI, this meant that a sizable fund would develop. In fact, in the intermediate-cost estimate made then, the ultimate size of the trust fund was well in excess of \$250 billion (it was about \$40 billion at the end of 1971).

#### 1972 Act

The 1972 Act did not change the self-supporting principle, but rather moved the financing basis for the future to current-cost (or pay-as-you-go) from the previous modified-reserve procedure. It is important to note that, in the past decade, the actual experience had been close to current-cost financing, due to the freezing of the tax rates or the postponement in part of scheduled increases. This is indicated by comparing the fund on hand with the outgo (for benefits, administrative expenses, and financial interchange with Railroad Retirement) for the next year.

This ratio was about 17 in 1940, when the payment of monthly benefits first began. It then rose to about 20 in 1943–44, but thereafter it declined to about 14 in 1949 and then dropped sharply to about 8 in 1950, after the benefit level was raised significantly to rec-

ognize the increase in the cost of living in the World War II period. After 1950, the ratio continued to decrease, and by the beginning of 1964, it was only 1.1. In all years from 1965 through 1971, the ratio was close to 1.0.

The 1971 Advisory Council on Social Security had recommended that the program be financed on a current-cost basis, with the trust funds maintained at a level approximately equal to one year's expenditures. The council recognized that this had been the case in the recent past, that this recommendation was "nothing new," and that many persons had "recognized that the funds should be held to such a contingency function." The council further recommended that the ratio of the fund to the next year's outgo should not fall below 75 percent or rise above 125 percent. (Under either circumstance, the Board of Trustees should immediately report to Congress whenever it perceived that this would be the case for the next year.)

The future tax schedule for OASDI for the 1972 Act was developed by Congress along the lines recommended by the advisory council, although the reporting requirement for when the ratio of fund to annual outgo fell outside the 75–125 percent range was not written into law. As a result of the large benefit increases in the 1972 Act, the test ratio for OASDI fell to 80 percent when computed at the beginning of 1973. Under the tax schedule adopted and the cost estimates made at that time, it would not rise to 100 percent until about 1990. It would appear that the legislation was framed to hold down near-future tax rates by "riding at the bottom of the range" of the ratio and thus financing benefit liberalizations by depleting the fund relatively.

The 1973 Act continued the same financing approach as that of the 1972 Act. However, because of anticipated relatively large short-range increases in benefits due to changes in the CPI, the test ratio for OASDI ratio of funds on hand at the beginning of the year to expenditures in the year—was then estimated to decrease over the next few years, from 72 percent for 1974 to 62 percent for 1978.<sup>13</sup> There is some indication that Congress established the "tradition" of a test ratio of 75 percent (i.e., riding the lower end of the range) when it enacted the July 1973 amendments (which, to a large extent, were overridden by the December 1973 amendments), because the Senate Finance Committee stated then that this ratio was "considered by the Congress last year as an acceptable level of contingent funds on

13. Computed from data on page 14, "Report of the Committee on Ways and Means, United States House of Representatives, to Accompany H.R. 11333," House Report No. 93-627, November 9, 1973.

hand.”<sup>14</sup> However, this tradition was soon broken (or at least badly fractured) by the December 1973 amendments.

Moreover, estimates made in 1974 showed an even more significant deterioration of this test ratio for OASDI. Such ratio, as shown in the 1974 Trustees Report, was estimated to decrease from 74 percent for 1974 to 48–51 percent for 1978. The situation continued to deteriorate with each successive Trustees Report, and the resulting financial situation then caused the actions taken in the 1977 Act, which continued, in theory, the self-supporting financing basis (although, in practice, the long-range cost situation was not adequately handled). The 1977 Act—perhaps unintentionally—changed the financing basis from pay-as-you-go to the hybrid one of temporary partial-reserve funding, by intending to build up a mammoth fund over a period of years and then liquidating it. However, for a number of years after 1977, the Trustees Reports did not recognize this and instead continued to state that the current-cost financing principle was being continued.

The 1983 Act did not change the financing basis, but rather exacerbated it by producing even larger fund buildup in the next few decades. The 1983 Act partially violated the self-supporting principle (by the payment from the General Fund of part of the employee tax in 1984 and by returning from the General Fund the proceeds of the income taxation of benefits to the trust fund which paid the benefits). Moreover, no longer is a minimum fund ratio (other than a ratio sufficient to meet benefit obligations on time as they arise) a subject of discussion in the congressional consideration. Some students believe that a ratio of 50–100 percent is desirable. Others are concerned about the high rates (as much as 300–500 percent) projected for the first few decades of the 2000s and believe that these should be avoided (as discussed in Chapter 5).

Beginning early in 1990, Senator Daniel Patrick Moynihan made great efforts to return the financing basis of the OASDI system to the pay-as-you-go (or current-cost) basis. This would be done by lowering the tax rate in the next 25 years and then gradually increasing it until, by about 2030, it would reach the level that would eventually be required for the benefit provisions in present law after the trust-fund balance had become exhausted. Such ultimate rate is, of course, higher than the level rate for 1990 and after which is now scheduled in the law (but which would eventually, after about 50 years, under

14. See page 19, “Report of the Committee on Finance, United States Senate, to Accompany H.R. 8410,” Senate Report No. 93-249, June 25, 1973.

the intermediate-cost estimate, have to be as high as the pay-as-you-go rate if no change is made in the benefit provisions).

The revised schedule of tax rates proposed by Senator Moynihan was constructed, on the basis of the intermediate-cost estimate, so as to result in fund ratios of about 100 percent (or slightly higher) in all years in the 75-year valuation period. Thus, it is clear that, under this proposal, the OASDI program would be adequately financed; if the future experience did not follow the underlying actuarial estimate, then quite naturally the future tax schedule could be revised, either upward or downward as needed.

The Moynihan proposal received widespread discussion and very definitely educated the general public about this important matter. It was opposed both by those who wished to have the OASDI excesses of income over outgo "count" for budget-balancing purposes and by those who, for one reason or another, wanted to have larger trust-fund balances. When the proposal, in somewhat modified form, came to a vote in the Senate in October 1990, it obtained 54 favorable votes and 44 unfavorable votes, but it lost because, on a procedural matter, 60 votes were required for it to be adopted. For more discussion of this subject, see page 489.

In April 1991, another vote on the Moynihan proposal was taken—on a procedural matter. It lost by a vote of 60 unfavorable votes to 38 favorable votes. This result occurred because of the strong opposition of President Bush and several senators who were concerned with the apparent effect on the General Budget.

Although no certainty exists that a fund ratio of 100 percent will assure that the OASDI Trust Funds could weather any sort of economic depression, it seems very likely that this is so. Factual evidence of this is that, if a fund ratio of 100 percent had been present when the 1977 Amendments were enacted (instead of only 47 percent), the financial crisis in the early 1980s would not have occurred (see Robert J. Myers, "Social Security under the Moynihan Proposal Is Adequately Financed," *Update*, National Academy of Social Insurance, Washington, D.C., May 1990).

In summary, it may be concluded that, from its inception in 1937 and for about the next 20 years, the OASDI program was financed, *as to its actual operations*, on what might be termed a partial-reserve basis. Then, from the early 1960s until the early 1970s, pay-as-you-go financing was present as to the actual experience and the short-run future, although not specifically legislated. Beginning in about 1972, current-cost financing was made official policy, but the legislative action in 1977 changed the funding basis to the hybrid one of building

up a mammoth fund over several decades and then liquidating it. The 1983 reform legislation exacerbated this policy (if it was one).

It is important to note that, in the period before the early 1970s—when the past experience had been, to some extent, of a current-cost financing nature (or else moving in that direction)—the intention *for the future*, as shown by the actuarial estimates, was always to have large fund build-ups over the long run, and not to have current-cost financing.

Tables 4.2 and 4.3 show when the fund balance was estimated to become exhausted (in those instances where this would occur in the 75-year valuation period—only in one instance in the estimates made before 1978) and also the maximum fund balances. Since 1983, the financing situation has become less favorable, as the underlying assumptions have been made somewhat more conservative (i.e., producing higher costs). However, the system is still in reasonably satisfactory condition, especially for the next 40 years (as will be discussed in more detail later).

TABLE 4.2. Retrospective Fund Ratios of OASI Trust Fund, Future Intermediate-Cost Estimates Made in 1935–71

<i>Year of Estimate</i>	<i>Maximum Fund Balance*</i>		<i>Ultimate Year<sup>†</sup></i>	
	<i>Year</i>	<i>Fund Ratio<sup>‡</sup></i>	<i>Year</i>	<i>Fund Ratio</i>
1935	1980	1,304 %	1980	1,304 %
1951 & 1952	1990	820	2000	690
1953 & 1954	1990	468	2000	375
1955	1990	334	2000	298
1956	2000	463	2000	463
1957	2000	435	2000	435
1958	2025	137 (357)	2032	0
1959	2025	658 (664)	2025	658 (664)
1960	2025	694 (861)	2025	694 (861)
1961	2025	587	2025	587
1962	2025	569	2025	569
1963	2025	640	2025	640
1964 & 1965	2025	597	2025	597
1966	2025	212 (248)	2025	212 (248)
1967	2025	1,567	2025	1,567
1968	2025	393 (383)	2025	393 (383)
1969	2025	1,190 (1,087)	2025	1,190 (1,087)
1970	2025	217 (236)	2025	217 (236)
1971	2025	256	2025	256

\* Maximum fund balance for years shown in published material (a nearby year might have a larger balance).

<sup>†</sup> Or, if earlier, the year when the fund is exhausted.

<sup>‡</sup> Figures in parentheses are for OASDI Trust Funds (which figures are not always possible to obtain).



TABLE 4.3. Prospective Fund Ratios of OASDI Trust Funds, Future Intermediate-Cost Estimates Made in 1978 and After

<i>Year of Estimate</i>	<i>Maximum Fund Balance*</i>		<i>Maximum Fund Ratio<sup>†</sup></i>		<i>Year of Exhaustion</i>
	<i>Year</i>	<i>Fund Ratio</i>	<i>Year</i>	<i>Fund Ratio</i>	
1978	*	*	2010	279%	2028
1979	*	*	2010	335	2032
1980	*	*	2010	335	1983 and 2030 <sup>§</sup>
1981	*	*	2010	133	1982 and 2025 <sup>§</sup>
1982	*	*	2015	177	1983 and 2027 <sup>§</sup>
1983	2045	255% (\$20.7)	2015	544	2063
1984	2045	219 (\$18.4)	2015	544	2060
1985	2030	315 (\$12.0)	2015	495	2049
1986	2030	342 (\$12.7)	2015	526	2051
1987	2030	356 (\$12.4)	2015	545	2051
1988	2030	341 (\$11.8)	2015	531	2048
1989	2030	336 (\$11.9)	2015	546	2046
1990	2025	422 (\$9.2)	2015	475	2043
1991	2025	321 (\$8.0)	2015	418	2041
1992	2025	230 (\$5.4)	2015	334	2036

Note: The fund ratios in this table (usually termed "contingency fund ratios") are the assets at the beginning of the year, including the 1-month advance tax transfers, as a percentage of disbursements during the year. (Note that legislation in 1990 eliminated such advance tax transfers for the future, unless they are necessary to meet outgo obligations.)

\*Maximum fund balance for years shown in published material (a nearby year might have a larger balance). The figures in parentheses are the fund balance at the end of the year (in trillions).

<sup>†</sup>Maximum fund ratio for years shown in published material (a nearby year might have a higher ratio).

<sup>‡</sup>Not known from published data.

<sup>§</sup>Although the fund is shown to be exhausted in the first year shown, if it could borrow monies, repayable with interest, it could in a short while repay the loan (in 1 year for the 1980 estimate, 11 years for the 1981 estimate, and 9 years for the 1982 estimate). However, as indicated by the second year shown, the fund balance would eventually become permanently exhausted.

#### Maximum Fund Ratios for Various Past Estimates

Tables 4.2 and 4.3 show, for estimates made in various past years, when maximum fund ratios were estimated to be reached, and their magnitudes. Table 4.2, relating to the estimates in 1935–71 for OASI, deals with retrospective fund ratios (fund balance at end of year to outgo during year), because data for prospective fund ratios were not available. Table 4.3, relating to the estimates for OASDI in 1978–90, presents the data under the usual prospective-fund-ratio basis.

It is clear that the legislation prior to 1970 had always intended to

have substantial OASI fund balances over the long run, although not necessarily in the immediate future years. The estimates made in 1970 and 1971 showed the move toward pay-as-you-go financing over the long range (because of the much lower maximum fund ratios thereunder).

Unfortunately, the Trustees Reports in 1972–77 (as well as other official sources) did not show projected fund ratios or projected year-by-year income, outgo, and fund balances in monetary terms. Rather, what was presented were year-by-year cost rates (outgo as a percentage of taxable payroll). Consideration of these figures led to the conclusion in the 1973 and subsequent Trustees Reports that the OASDI program was, over the next 50 years, to be financed on a pay-as-you-go (or current-cost) basis.

For example, the 1977 report stated that “since the 1950s (OASDI) has been operated on what may be termed a current-cost financing basis.” Several reports (1978, 1981, 1982, and 1983) stated that “There is general agreement that the OASDI system should be financed on the basis of a ‘pay-as-you-go’ method.”

Other reports stated that “the general philosophy of financing the OASDI program has been that the annual tax revenues should approximately equal the annual expenditures, and the trust funds have been intended only to absorb temporary excesses of expenditures over income” (1980) and that “The OASDI system has generally operated over the years on a ‘current-cost’ financing basis” (1984). All reports after 1984 have been silent on the question as to whether the financing should be on a pay-as-you-go basis and whether, indeed, it is on this basis, both in the past and for the future.

Table 4.3 clearly shows that the intention as to the financing basis in the 1977 and 1983 Acts was definitely to build up sizeable fund balances, which would be far above pay-as-you-go levels. The 1977 legislation envisaged maximum fund ratios of about 300 percent, while the corresponding level for the 1983 Act was well over 500 percent. Thus, the foregoing statements in the various Trustees Reports were not fully in accord with the facts.

#### *Effect of Automatic-Adjustment Provisions*

The automatic-adjustment provisions introduced by the 1972 Act did not directly affect the financing basis of OASDI, insofar as necessitating higher tax rates. As mentioned in Chapter 3 and as brought out in more detail in Appendix 4-1 and in Chapter 10 when the actuarial cost estimates are discussed, the effect of the necessary eco-

conomic assumptions about wage and price trends can be very significant and serious for the financing of the system.<sup>15</sup>

As part of these automatic-adjustment provisions, it is provided that when they produce a benefit increase, the Secretary of Health and Human Services is to report to Congress on the extent to which the increased cost of the benefits is met by the increase in the taxable earnings base triggered thereby.

#### Separate OASI and DI Trust Funds

As a result of the 1956 Act, the OASDI program has had two separate trust funds—one for old-age and survivors benefits and the other for disability benefits. This division has no real significance in regard to the financing of the program. It was adopted as a “guarantee and assurance” that the newly provided disability benefits would not bankrupt the trust fund (if all benefits were to be paid from a single one) in the event that the disability experience proved much less favorable than estimated.

#### Use of Cost Estimates in Legislative Process

Over the years, the actuarial cost estimates prepared by the Social Security Administration have been used by Congress as the basis for its consideration of changes in the OASDI program. Particularly since the positive recognition and adoption of the self-supporting principle in 1950, the cost estimates have tended to play a very important role in its legislative development.

Before any legislative action, Congress studies carefully the cost of proposed benefit liberalizations in the light of the financial situation of the existing system—that is, whether any additional financing is necessary or, conversely, whether an actuarial surplus is present that can be used to liberalize benefits without additional financing being needed.

At times, Congress has determined that liberalizations were too costly, and they have been trimmed down or eliminated. For example, in 1956, the House voted to pay full benefits at age 62 (instead of age 65) to all categories of female beneficiaries and to provide monthly disability benefits beginning at age 50. This was to be financed by a 1-percent increase in the combined employer-employee tax rate in all

15. For a challenging and incisive demonstration and discussion of this aspect, see Geoffrey N. Calvert, *New Realistic Projections of Social Security Benefits and Taxes* (New York: Alexander and Alexander, 1973).

future years. The controlling reason for restricting disability benefits to those aged 50 and over was cost.

The Senate, however, was not in favor of an increase in the contribution schedule as large as 1 percent and so provided actuarially reduced, rather than full, benefits for women workers and wives (but full benefits for widows) claiming them before age 65. This action, permitting the increase in the combined employer-employee tax rate to be held to  $\frac{1}{2}$  percent, was agreed to by the House and was enacted.

### **Financing Basis of OASDI**

Before the 1972 Act, the OASDI system was financed neither on a full-reserve basis nor on a pay-as-you-go or current-cost basis. Rather, it may be said to have been financed on a partial-reserve basis. The trust funds then were expected to play two roles—to provide interest earnings so that ultimate tax rates could be somewhat lower than if there were no accumulated fund and to be used as contingency funds to meet any excess of outgo over income in years when this would result from poor economic conditions or from the operation of the graded tax schedule.

Under the law prior to the 1972 Act, the OASI Trust Fund was estimated to grow rapidly in the future, as a result of the scheduled increases in the tax rates in 1973 and 1976. Over the long run, it was estimated that, under the financing basis of that law, interest receipts would meet about 10 to 15 percent of the benefit costs.

The question had been raised in some circles of economic thought as to whether such large funds (with resulting interest income) should be allowed to develop, because of the possible deflationary effect on the economy. For example, in connection with the legislation considered in 1964, Secretary of Health, Education, and Welfare Anthony J. Celebrezze testified before the Senate Finance Committee as follows: "Under this schedule the contribution rates would increase more slowly and gradually than under present law, so that excessive accumulations of funds in the next several years, with possible depressing effects on the economy, would be avoided."

The change in the 1972 Act to a current-cost basis was intended, among other things, to make the effect of the OASDI system on the overall economy relatively neutral. The trust funds would continue to play the two roles that they had played in the past, although to a much lesser extent with regard to providing some of the financing for the system through the interest earnings. Nonetheless, such earnings would meet 5–6 percent of the cost each year (if the trust-fund balance is about one year's outgo and if the interest rate is about 5–

6 percent), or about 5 times as much as needed to pay for the costs of administration, which currently represent only about 1 percent of total outgo. Or the interest might be viewed as being used first to increase the size of the trust fund so that it would maintain its same relative level as compared with outgo, in which case it would largely be used up in doing so.

#### Financing Basis under 1977 Act

Although Congress did not directly say so, the 1977 Act departed significantly from the current-cost financing principle—at least over the long run. For several years, the test ratio of the fund on hand at the start of the year to annual outgo in the coming year for the OASI and DI Trust Funds combined, according to the estimates made at the time the legislation was enacted, would be relatively low (and well below 100 percent). However, the tax-rate increases scheduled for 1985 and 1990 would result in a large buildup of the fund—both relatively and, especially, absolutely in terms of dollars. In fact, this test ratio would reach a peak of 3.2 in 2010 according to the intermediate estimate made in 1977, or well in excess of a current-cost level. Thereafter, such ratio would decrease, because of the long-range lack of actuarial balance (to be discussed next). Of course, it is quite possible that, when such substantial buildup of the trust funds actually begins to occur, the scheduled increases in the tax rates would not be allowed to take place.

#### Projected Short-Run Financial Experience as Estimated after 1977

It was anticipated that, after the 1977 Act, the decline in the test ratio which had been going on for several years would slow down and soon halt. The intermediate-cost estimate in the 1978 Trustees Report showed the ratio decreasing to 21 percent at the beginning of 1981, but increasing thereafter. However, the high-cost (or pessimistic) estimate showed a continuing decline until 1984 (when the ratio would be 14 percent) and then a slow rise. This situation, and the estimates for the later years, led some (such as President Carter) to assert that all financing problems of OASDI were solved for at least the next 50–75 years. Obviously, if the short-range experience were much more unfavorable than that assumed in the high-cost estimate,<sup>16</sup> the combined funds could run out of money before 1985.

16. This did not seem impossible by any means. The assumed annual rates of increase for the CPI in the intermediate-cost estimate for 1980–84 ranged down from 9.7 percent for 1980 to 7.8 percent for 1984. The future prospects for such lower rates

When the OASI and DI Trust Funds are considered separately, a different picture emerged. The DI Trust Fund was shown by the 1979 Trustees Report to be in excellent shape, whereas the reverse was true for the OASI Trust Fund. This occurred because the much-larger-than-expected price inflation significantly affected the OASI Trust Fund in an adverse manner, whereas for the DI Trust Fund, this element was more than offset by the lower disability incidence rates in the last two years than had previously been projected. In other words, in hindsight, the reallocation by the 1977 Act of more money to DI and less to OASI was an overcompensation.

According to the intermediate-cost estimate in the 1979 Trustees Report, the test ratio measured at the beginning of the year for OASI would fall from 30 percent for 1979 to 19 percent for 1985, while for DI the corresponding figures were 29 and 121 percent. On the other hand, under the high-cost assumptions, the test ratios in 1985 were 2 percent for OASI and 98 percent for DI. Such a low ratio for OASI did indeed pose a very serious problem, both because of the near-exhaustion of the fund and because of the cash-flow situation involved. The fund balance is stated as of the end of the month. Yet, in the next few days, a month's benefits must be paid from the fund, which represents almost 9 percent of the year's outgo. Thus, under the law as it was before the 1983 Act, if the test ratio is ever less than 9 percent, the fund could not meet its obligations in the next few days (even though the coming month's tax receipts might be ample to make up the deficit).

Even if there is a satisfactory test ratio for OASI and DI combined, a low ratio for one fund would, nonetheless, involve a serious problem. This could be solved by a change in the law—either by permitting one fund to borrow from the other or by revising the allocation of the OASDI tax rate between the two funds (as has been done several times).

The unfavorable economic events (accelerated price inflation) that occurred after the cost estimates for the 1979 Trustees Report had been prepared changed the picture greatly. According to the intermediate-cost estimate in the 1980 Trustees Report, the test ratio for the OASI Trust Fund would drop below the critical value of 9 percent by the beginning of 1982. Even for OASI and DI combined, this would occur by the beginning of 1983, so that borrowing between

---

than the current situation did not seem certain (and, in fact, the actual developing experience was higher). Moreover, the differential of wage increases over CPI rises (which is a crucial cost element) experienced in 1980 was negative and thus significantly less than the differential in the assumptions, which optimistically assumed positive values averaging 1.1 percent per year for 1981–84.

these two trust funds would not result in a satisfactory cash flow. The remedy then could be to obtain financing from other sources, such as borrowing from the HI Trust Fund (which was then estimated to be in a satisfactory situation for at least the next five years) or from the General Fund of the Treasury.

The situation would be alleviated by the increase in the OASDI tax rate scheduled for 1985. This is shown in the following table for the test ratios under the intermediate-cost estimate in the 1980 Trustees Report, both for OASDI combined and for OASDI-HI combined (the latter being indicative of the situation if borrowing were permitted from the HI Trust Fund).

<i>Calendar Year</i>	<i>Ratio at End of Year</i>	
	<i>OASDI</i>	<i>OASDI-HI</i>
1980	24%	29%
1981	18	24
1982	12	22
1983	8	21
1984	5	21
1985	3	23
1986	7	29
1987	12	36

As would be expected, the high-cost assumptions in the 1980 Trustees Report showed a less favorable picture than did the intermediate-cost ones. The fund ratio for OASDI would fall below the critical level of 9 percent by the beginning of 1982 and below zero by 1984 (i.e., the fund is exhausted). Even under the low-cost assumptions, the test ratio for OASDI would fall below 9 percent before the end of 1984.

Obviously, some measures had to be taken to strengthen the financing of the OASI Trust Fund. Accordingly, legislation enacted in late 1980 provided a stop-gap solution which prevented any possibility that the OASI Trust Fund would be exhausted before 1982. The OASDI tax rates for 1980–81 were left unchanged, but they were reallocated between OASI and DI, giving the former a larger portion (see Tables 2.13 and 2.14 for the details).<sup>17</sup> The effect was to slow down the decrease in the OASI Trust Fund and to cause the DI Trust

17. It may be noted that no problems existed because the legislation was enacted in late 1980 and affected 1980 taxes retroactively. The total OASDI rate was unchanged, and so the general public was not affected. All that was involved was a bookkeeping adjustment between the two trust funds, along with appropriate interest adjustments.

Fund also to decline in 1980–81. The test ratio for both trust funds would be about 10 percent at the beginning of 1982, and the ratio for OASI would fall below the critical level in 1982. Accordingly, legislative action in 1981 seemed essential.

The actual experience in 1980 and after was much more adverse than had been anticipated in 1977–80. At the beginning of 1982, the ratio for OASDI was only 15 percent and was projected by the intermediate-cost (Alternative II-B) estimate in the 1982 Trustees Report to continue to decrease—to 10 percent at the beginning of 1983 (including in the trust-fund balance an estimated loan of \$5.3 billion from the HI Trust Fund), or to 7 percent on a “net assets” basis. This was, of course, indicative of the financial crisis which gave rise to the 1983 Act.

The 1983 Act significantly remedied the situation. According to the intermediate estimate in the 1983 Trustees Report, the ratio would increase to 20 percent to 25 percent during 1984–88 and then rise steadily for several decades. Even under the pessimistic estimate, the ratio will not fall much below 20 percent during 1984–88 (and then will rise). In part, this higher level is due to the inclusion of the advance tax transfers for January in the fund balance used (which accounts for about 8 percent of the ratio of 20 percent). A similar picture was presented in the 1984 Trustees Report.

#### Projected Long-Range Financial Experience as Estimated after 1977

Despite the changed situation for the short run according to the cost estimates prepared immediately after 1977, the long-range situation still indicated a very large accumulation of funds by OASI-DI combined beginning in 1990 and peaking about 2010. The maximum fund ratios in the intermediate-cost estimates in the 1978–80 Trustees Reports were 280 percent in 2010, 340 percent in 2010, and 260 percent in 2009 respectively.

This situation of much larger trust-fund balances than current-cost financing calls for could quite easily have been remedied by reducing the tax-rate increase in 1990. At the same time, it would probably have been desirable to schedule a somewhat larger rate increase in the distant future (say, in 2010) than the decrease that would be made for 1990.<sup>18</sup>

18. For an interesting discussion of various alternative methods of handling the problems of the long-range actuarial deficit and the “excessive” fund balance some 15–30 years from now, see Yung-Ping Chen, “Long-Range Actuarial Deficit of Social Security and Dependency Ratios,” *Eastern Economics Journal*, December 1979.



It was on this account that the National Commission on Social Security recommended in 1980 that the tax rates scheduled should *decrease* after 1989 and remain below the 1989 rate for three decades (see Chapter 3).

The estimates in the 1984 Trustees Report show an even larger fund buildup following 1990. The intermediate-cost estimate (Alternative II-B) has a peak ratio of 540 percent in 2016, and it is in excess of 100 percent until 2054. Even under the pessimistic estimate (Alternative III), a peak of 200 percent is reached in 2010. It seems obvious that, if the experience developed in this manner, such large fund balances should not be allowed to build up. Preferably, in the author's view, this should be done by temporarily reducing the tax rates.

Subsequent actuarial estimates, as contained in the yearly Trustees Reports, continued to show these mammoth trust-fund buildups in the 1990s and the first two or three decades of the next century (see Table 4.3). The author testified several times before Congressional committees (e.g., on May 13, 1988) in favor of returning to pay-as-you-go financing for OASDI.

In late December 1989, Senator Daniel Patrick Moynihan put forth a proposal to reduce the OASDI tax rates immediately and to return the program to a pay-as-you-go basis (see discussion, page 390.)

#### Congressional Responsibility in Financing OASDI

Although, in some quarters, there had been considerable criticism of the fact that, since 1950 and until 1972, legislative action had liberalized the OASDI system about every two years, one important point should be kept in mind. Each time there was legislative activity, Congress—particularly the important, controlling legislative committees concerned—very carefully considered the cost aspects of all proposed liberalizations. Any changes made were, at least until the 1977 Act, reasonably fully financed according to the best actuarial cost estimates available; once again this was done in connection with the 1983 Act.

Thus Congress attempted to keep the system on a self-supporting basis by keeping benefit costs very closely in balance with tax income. The committees had always been anxious to be able to say that the program was “actuarially sound.” Certainly, the program can be said to have had staunch financial safeguards as long as Congress continued to be cost-conscious, as it has been in the past, and to finance benefit liberalizations adequately.

**Measurement of Actuarial Status of OASDI**

Although the short-range actuarial status of OASDI is measured by the test ratio of the balance of the trust funds to the annual outgo, a different procedure has been followed for measuring the long-range status. The balancing of benefit and administrative expense costs against tax income is considered in terms of average or level costs expressed as percentages of payroll.<sup>19</sup> Quite naturally, and only by the greatest of coincidences, would an exact balance be shown. Congress has, ever since 1950, established a guideline as to the “permissible” lack of balance of income compared with outgo that would still be possible, considering the variability of the long-range estimates, and yet the system could be said to be in a sound actuarial and financial condition.<sup>20</sup> If this test is met, the system is said to be in “close long-range actuarial balance.”

Initially this “permissible” margin was 0.25 percent of taxable payroll. It was increased to 0.30 percent when disability benefits were added to the program in 1956. Then, in 1965, it was reduced to 0.10 percent when the valuation period was shortened from infinity to 75 years, as a prudent counterbalancing element to the shortened valuation period. Finally, in 1972, when the automatic-adjustment provisions were adopted and dynamic economic assumptions were first used, the basis of the margin was changed. Now, this margin is established at 5 percent of the estimated average long-range benefit cost (as against only 1 percent under the previous basis). Currently, this works out to be about 0.70 percent of taxable payroll for the intermediate-cost estimate (Alternative II).

The final action taken by Congress in connection with the 1977 Act, however, departed somewhat from the past procedures of providing long-range actuarial balance for OASDI as measured over a 75-year period, according to the best estimates available. The Senate-passed version of the legislation would have achieved this result by several increases in the tax schedule after 1990, but this was not agreed to by the House conferees.

As a result, the 1977 Act left the OASDI system with a long-range actuarial deficit of 1.46 percent of taxable payroll (as estimated at the time of enactment). This was a reduction of somewhat more than 80 percent relatively from the actuarial deficit of 8.20 percent of payroll under the program as it was before the 1977 Act, but nonetheless was far more than should be allowable if substantial actuarial balance were

19. See Appendix 4-1 for a detailed description of how these are derived.

20. This is not done by provisions in the law, but rather by statements in committee reports on pending legislation.

to be claimed.<sup>21</sup> It may be noted that the deficit existing after the 1977 Act was enacted represented about 11 percent of the average cost of the outgo.

The 1983 Act, however, returned to the traditional procedure. In fact, the intermediate-cost estimate prepared at the time of enactment of the legislation showed a small surplus (0.02 percent of the taxable payroll). The corresponding figure in the 1984 Trustees Report was a small, relatively nonsignificant deficit of 0.06 percent of taxable payroll (the reasons for the changes are discussed in Chapter 10).

As shown in Table 10.11, this deficit has gradually increased in the subsequent Trustees Reports and was 1.08 percent of taxable payroll in the intermediate-cost estimate of the 1991 Trustees Report (an increase of 0.17 percent from the 1990 report). Such deficit represents 7.6 percent of the average cost rate (14.19 percent), so that the “5-percent” test of close long-range actuarial balance was not met. Such a situation had also existed in the 1990 Trustees Report, but to a lesser extent (the deficit then being 6.5 percent of the average cost rate). The Board of Trustees, despite the dissent of Chief Actuary Harry C. Ballantyne, decided to eliminate from consideration the test of close long-range actuarial balance in the 1989 and 1990 Trustees Reports. However, legislation in 1990 now requires that the Trustees Report should include a finding as to whether the OASI and DI Trust Funds, combined and individually, are in close actuarial balance (as defined by the Board of Trustees). The 1992 Trustees Report showed a further increase in the deficit—to 1.46 percent of taxable payroll, or 10.0 percent of the average cost rate.

It is important to note that, in the 1988 Trustees Report, the method of determining the long-range actuarial balance was revised—actually, changed back to the method used before 1971. The new procedure, which was termed the “level-financing” basis, takes into account the fund on hand on the valuation date and discounts at interest all future income and outgo operations (as well as the measurement base of taxable payroll). The former procedure, which is termed the “average-cost” basis, does not take into account the initial fund, and it merely averages the cost rates and the income rates for each of the 75 years in the valuation period, without considering interest discounting (i.e., the time value of money). In the opinion of the author, the “level-financing” basis is by far the proper one to use in measuring the long-range financing status of OASDI. The Social Security Technical Panel established by the 1991 Advisory Council on Social Security supported this approach (see Appendix F).

21. More detailed discussion of these data is given in Chapter 10.

The 1988 Trustees Report gave the actuarial balance under both the level-financing and the average-cost bases. Under the former, the deficit was 0.58 percent of taxable payroll, which represented 4.3 percent of the average cost rate and was thus within the limit of close actuarial balance. On the other hand, under the average-cost basis, the deficit was slightly larger—0.87 percent of taxable payroll, which represented 6.3 percent of the average cost rate and was thus slightly outside the limit of close actuarial balance.

The terminology “level-financing basis” is somewhat misleading, because it seems to imply that the funding of the OASDI system *must* be on the basis of level tax rates in all future years. Such is not really the case, but rather the test is merely a measuring device which properly recognizes the time value of money. Perhaps because of the confusing nature of the term “level-financing,” it is not used in the 1990 and later Trustees Reports. Perhaps the best description of this basis for determining the actuarial balance of the program is the “present-value basis.”

In the 1991 OASDI Trustees Report, new tests of the actuarial status of the program were introduced. These followed the recommendations of the Social Security Technical Panel of the 1991 Advisory Council on Social Security (see Appendix F). In general, the tests are merely extensions of what had been done in previous reports, although they are somewhat complex.

As to the previous short-range test, the year-by-year progress of the trust funds—OASI and DI separately, as well as combined—had been considered in general terms. As long as the fund balances increased over the 5-year period considered, all was stated to be well.

Now, the program (considered for OASDI as a whole and also separately for OASI and DI) is considered to pass the test of short-range financial adequacy if, over the first 10 years after the valuation date, one of the following rules applies.

1. If the fund ratio (the fund balance at the beginning of the year as a percentage of the outgo for benefit payments and administrative expenses for the year) is at least 100 percent on the valuation date and remains so for the next nine years.
2. If the fund ratio is less than 100 percent on the valuation date, and it increases to at least 100 percent for the sixth year and the following four years (and, during the first five years, the fund always is sufficient to meet the outgo).

As to the previous long-range test, the summarized income and cost rates for the 75-year valuation period were compared. The summa-

alized income rate is the present value, as of the valuation date, of the 75-year income from the payroll taxes and the income taxes on benefits, expressed as a percentage of the present value of the 75-year taxable payrolls, plus the value of the trust-fund assets on hand at the beginning of the valuation period. Similarly, the summarized cost rate is the present value of the 75-year outgo for benefit payments and administrative expenses, again expressed relative to taxable payroll. Then, if the summarized income rate was less than 95 percent of the summarized cost rate, the program was said to be “out of close actuarial balance”—that is, it had a significant actuarial deficit.

Two changes have been made in the long-range test. First, the computation of the summarized cost rate also includes the present value of a fund balance at the end of the valuation period equal to the outgo for the following year. Second, the measurement is made not merely for a 75-year valuation period, but also for valuation periods of 11 years, 12 years, and so forth, up through 74 years. The test ratio of 95 percent applicable to the 75-year valuation is modified on a pro rata basis for the shorter valuation periods, being 99.9231 percent for the 11-year valuation ( $100, \text{ minus } \frac{1}{65} \text{ times } 5$ ); 99.9846 percent for the 12-year valuation ( $100, \text{ minus } \frac{2}{65} \text{ times } 5$ ), and so forth, to 95 percent for the 75-year valuation. If, for any valuation period, there is a deficiency of the cost rate as compared with the income rate, and, if this relative deficiency (as a percentage of the cost rate) exceeds the “allowable amount” ( $100 \text{ percent, minus the test ratio}$ ), then the long-range test of close actuarial balance is not met.

The intermediate-cost estimate in the 1992 OASDI Trustees Report shows that the combined OASDI Trust Funds readily meet the short-range test of financial adequacy, with the fund ratio rising steadily from 82 percent for 1991 to 206 percent for 2001. Both the low-cost and high-cost estimates also meet the test, with the fund ratios for 2001 being 292 percent and 134 percent respectively.

When only the OASI Trust Fund is considered, the test is even more readily met. The fund ratios for 2001 are 245 percent for the intermediate-cost estimate, 323 percent for the low-cost estimate, and 180 percent for the high-cost estimate.

The picture is quite different for the DI Trust Fund considered alone. Under the intermediate-cost estimate, the fund rises from 39 percent for 1991 to a peak of only 40 percent for 1992 and then decreases to exhaustion in 1998, and thus the test is not met. The low-cost estimate shows a situation that also does not meet the test, with the fund ratio rising slowly during the next 10 years, but reaching only 72 percent in 2001. Under the high-cost estimate, the fund ratio reaches a peak of only 42 percent for 1992 and becomes less than

zero for 1996 (i.e., fund exhausted in previous year), so that the test is miserably failed.

It is important to observe that, based on the results for the combined OASDI Trust Funds, a mere reallocation of the OASDI tax rate (giving more to DI) would enable both OASI and DI to meet the short-range test.

Turning to the long-range test for close actuarial balance of the combined OASDI Trust Funds under the intermediate-cost estimate, the minimum allowable relative deficiency is not exceeded for all of the valuation periods beginning with the 1992–2001 one up through the 1991–2036 one. The specific figures for the 1991–2036 valuation are:

- (a) Income rate: 13.16% of payroll.
- (b) Cost rate: 13.50% of payroll.
- (c) Deficiency: –0.34% of payroll.
- (d) Deficiency: 2.48% of cost rate.
- (e) Allowable relative deficiency amount: 2.69%.

Thus, for this valuation period, the test is just barely met. However, for valuation periods beginning with 1992–2037 and continuing up through the 75-year valuation period (1992–2066), the estimated actuarial balance is below the minimum allowable amount. Thus the OASDI program is not in close actuarial balance.

When only the OASI Trust Fund is considered, the test is met for all valuations up through the 1992–2047 one. Conversely, none of the valuations of the DI Trust Fund meet the test.

It would seem that the long-range test could well be modified such that the allowable relative deficiency amount as computed by the stated procedure should not be less than 1.0 percent (whereas in practice it can be as low as 0.1 percent). In any event, the long-range test does not seem to be very meaningful for short valuation periods, such as those for less than 25 years. The best test for that mid-range period would seem to be an extension of the 10-year short-range test.

But it is important to note that, under this procedure for measuring the long-range actuarial status of the OASDI program, although the current program, with its level tax rate for 1990 and after, may be in “actuarial balance” for the 75-year valuation period, after the end thereof the annual cost will be significantly *higher* than the ultimate tax rate (which was sufficient to produce “balance” in the 75-year valuation period). For the 1992 Trustees Report, such differential after the 75-year valuation period is 5.0 percent of taxable payroll. In the author’s opinion, this somewhat anomalous situation is another

reason why the valuation period should be into perpetuity, rather than for a fixed period of years. However, this effect is compensated for when the valuation date moves into the future, and thus the 75-year period includes more of the “ultimate” years. Then, each successive valuation shows, because of this factor alone, a slightly larger actuarial lack of balance (or a smaller surplus), so that an element of automatic self-correction is present—although it may be somewhat puzzling to nonactuaries.

In recent years the Trustees Reports have carried certain analyses of long-range costs of OASDI in addition to the traditional 75-year ones. The measurements of the balance of income compared with outgo, expressed as percentages of taxable payroll, have been made separately for each of the three 25-year periods, as well as for the entire 75-year period. If such measurement for the 1977 Act, both at the time of enactment and in the 1978 to 1980 Trustees Reports, had been made for only a 50-year period, then close actuarial balance would have been shown. In the author’s opinion, such shortening of the valuation period is neither prudent nor proper.

### **Social Security and the Unified Budget**

Until the late 1960s, the operations of the OASDI and Medicare trust funds were not reflected in the general budget of the U.S. government. In other words, the trust-fund operations were considered to be completely separate from other government operations and did not affect the budget balance (or imbalance). Beginning with the budget for fiscal year 1969 (July 1968 through June 1969), such trust-fund operations—as well as those of other trust funds administered by the federal government—were reflected in a unified budget. This was done because economic planners asserted that they were interested in all financial activities and operations of the federal government, and therefore this basis should be used for the budget.

Some confusion and public misunderstanding have occurred as a result of the unified budget. There are those who believe that the social security taxes are merely placed in the General Fund of the Treasury and then are unaccounted for and used for other purposes. This is not so, because there is strict accounting. All monies in excess of what is needed for current expenditures are invested in interest-bearing issues.

Others are puzzled as to how it can happen—and it did in fiscal year 1969—that the budget can show a surplus and yet the national debt increases. The reason this happened is that OASDI and Medicare had a sizable excess of income over outgo (which was used to

purchase government obligations and thus was reflected in the national debt) that was large enough to more than offset the lack of balance in the "regular" budget.

It seems essential that the operations of the social security trust funds should be relatively neutral insofar as the economy is concerned. Likewise, the operations of the trust funds should not be manipulated, as some economic planners would like to do, to either stimulate or slow down the economy (as such planners thought best) or to affect the balance of the budget. The 1971 Advisory Council on Social Security expressed its views on this subject as follows: "Even though the operations of the social security trust funds and other Federal trust funds programs are combined with the general operations of the Federal Government in the unified Federal budget, policy decisions affecting the social security program should be based on the objectives of the program rather than on any effect that such decisions might have on the Federal budget."

In March 1974, Chairman Wilbur D. Mills of the House Ways and Means Committee introduced a bill (H.R. 13411) that contained a section providing for the removal of the OASDI and Medicare trust-fund operations from the budget presentations. Although action was not taken on this bill, considerable significance can be attached to the views of this knowledgeable member of Congress, who at that time wielded great power.<sup>22</sup>

The National Commission on Social Security Reform recommended that this be done immediately for the OASI, DI, HI, and SMI Trust Funds. However, because of opposition by the House and Senate Budget Committees, such change was deferred, so as to begin with fiscal year 1993 (and then will not apply to the SMI Trust Fund; in the author's view, this fund should equally logically have been treated in the same manner as the three payroll-tax-supported funds).

As a result of the Gramm-Rudman-Hollings Act, beginning in fiscal year 1986, the operations of the OASDI Trust Funds have been removed from the unified budget, so that any excess of their income over outgo does not reduce the budget deficit. However, anomalously, these trust-fund excesses of income over outgo are counted to meet the G-R-H targets for budget-deficit reduction. The result is thus virtually the same as if these trust-fund operations were included in the budget, but the imbalance is really still there, and the national debt is increased by the amount of the trust-fund excesses of income over outgo. In other words, the result of this procedure is, in the short

22. See page E1521, *Congressional Record*, March 18, 1974, for Mr. Mills's supporting statement for this proposal.



run, to make the targets easier to meet and thus to make the budget deficits appear smaller than they really are.

In the last few years, this procedure has been widely criticized. Senator Daniel Patrick Moynihan (D, N.Y.) has labeled it “thievery”; the late Senator John Heinz (R, Pa.) said it was “embezzlement.” The 1991 Advisory Council on Social Security supported “removing Social Security from the calculation of deficit reduction targets to focus public attention on the importance of reducing the deficit in the rest of the budget.” Senator Moynihan made such removal an integral part of his proposal to return the financing of the OASDI program to a pay-as-you-go basis (see page 390).

### Investment Procedures

Throughout the entire period of operation of the OASDI program, the method of investing the assets of the trust funds has changed relatively little. In general, it may be said that the trust funds, which are under the direction of the Secretary of the Treasury, receive the tax income and pay the benefits and administrative expenses. The excess of the income over the outgo is invested in obligations of the federal government, and the interest therefrom augments the income of the system.

#### Collection and Transfer of Taxes

Since the middle of 1940, the tax collections have been automatically appropriated to the trust funds as they are received by the Treasury Department.<sup>23</sup> Before then, a somewhat different procedure was followed. The authorized appropriations to the Old-Age Reserve Account (as it was called then) were not specifically to be measured by the taxes collected, but rather were to be “an amount to be determined on a reserve basis in accordance with accepted actuarial principles.” Underlying legal and constitutional aspects made a distinct division between the taxes collected and the benefits paid seem desirable. In actual practice, however, this language was interpreted to mean that the appropriations should be the estimated net proceeds of the taxes, after deduction for the estimated administrative expenses

23. Initially, this is done on an estimated basis, but with retroactive adjustments based on actual posted reported earnings. Following the 1983 Act, the taxes estimated to be received in each month (other than, during 1984–86 only, those with respect to employees of state and local governments) were credited to the trust funds at the *beginning* of the month, but interest is paid by the trust funds to the General Fund to allow for these advance payments. Beginning in 1991, this is no longer done.

(which procedurally were paid out of the General Treasury but, of course, in practice came from the gross tax receipts).<sup>24</sup>

After the program was declared to be clearly constitutional in 1937, this indirect procedure was no longer necessary. As a result, the 1939 Act provided for the current automatic-appropriation basis. At the same time, “insurance” terminology was introduced in referring to the program, both in the law and in public explanations presented by the Social Security Administration. In part, this was proper, because OASDI is social insurance, but this approach was somewhat overdone to draw on the good name of private insurance to build confidence in and support for OASDI.

### Types of Investments

The investments of the trust funds can be either in special issues or in any other securities of the federal government. Some regular issues have actually been bought, both on the open market and when they were offered to the general public. Special legislation has provided that certain semigovernment issues—such as those of the Federal National Mortgage Association (so-called Fannie Mae)—can be purchased by the trust funds, even though they are not guaranteed for both principal and interest by the government.

The vast majority of the investments, however, have been in special issues. Before 1940, it was provided that these special issues should bear an interest rate of 3 percent. From then until the 1956 Act, they carried an interest rate slightly below the average coupon rate on all interest-bearing obligations of the United States outstanding at the end of the month preceding the issue of the special issues.

The 1956 Act changed the interest basis for special issues so that it was determined from the average coupon rate on all *long-term* government obligations (issued initially for five or more years), rounded to the nearest  $\frac{1}{8}$  percent. The 1960 Act revised this interest basis, so that the interest rate is now determined from the average *market yield* rate on government obligations that are not due or callable for at least

24. Because the original method of appropriation was on an estimated “net” basis, there was no exact balance between net income (after deducting actual administrative expenses) and appropriations made. In the  $3\frac{1}{2}$ -year period, the total excess of tax collections over appropriations was \$141 million. Offsets against this were administrative expenses during the same period of \$76 million and tax refunds paid by the General Treasury and not reimbursed by the trust funds for the period through June 1952 (after which refunds were chargeable to the trust funds), amounting to \$38 million. As a result, a sufficiently close balance had, in essence, been achieved for the period of the first  $3\frac{1}{2}$  years of operation, when there was not completely precise accounting of tax income.

four years from the date of determination. The actual experience over the years on the interest rates applicable to special issues and the durations until their maturity is described in Appendix 4-2.

In 1983, the National Commission on Social Security Reform recommended that the investment procedure should be changed. The investments would no longer be for prescribed durations, but would instead have interest rates that would reflect current market yields on long-term government obligations (similar to money-market funds) and would, in essence, be rolled over every month. Both the House and Senate bills contained such a provision, but it was dropped in conference (for reasons discussed in Chapter 3). Interestingly, the par-value special-issue investments of the Railroad Retirement Account are of this form (but they have a slightly different long-term interest-rate basis).

#### Alternative Possible Investment Procedures

Although there has been some opposition to investing the excess income of the system in government bonds, no appreciable positive support has been offered for any other form of investment. All other possibilities have seemed to be objectionable for overwhelming reasons.

One possible investment practice would be to purchase securities of private concerns, either bonds or stocks. There are several objections to this approach. First, with the large amount of money available, the government would control a considerable portion of the private industrial economy, which would, in effect, result in "socialism by the backdoor method." Another practical disadvantage would be the need for a far-reaching and deep-searching investment policy that would permit the trust funds to obtain an adequate rate of interest with reasonable security of principal. Under such a policy, the government would, in effect, be setting itself up as a rating organization, because the investment procedures would naturally have to be open to full public view. If no preference were shown for different types of securities, but rather investments were made widely and indiscriminately, there would be a serious danger of loss of principal and diminution of investment income.

Another possible procedure would be to invest the funds in social and economic activities such as the construction of housing, dams, hospitals, and the like (as is done in some countries). This method would be open to some objection on the ground mentioned previously—government entry into private fields of activity. Even more serious is the argument that any use of public funds for such purposes

should be under the control of the elected representatives of the people (Congress), rather than the indirect and less visible approach of having a social insurance organization making decisions as to what is best for the country.

A somewhat related procedure would be to lend the monies to state and local governments by purchasing their bonds (so that they could do such things as build or repair bridges and highways). One objection to this procedure would be the political difficulty of discrimination between states as to the potential security of the investments. Also, because of their tax-exempt nature, such bonds carry a lower interest rate than do federal government bonds; to offset this, it has been proposed that the federal government should make up the difference, but this does not really seem to make much sense.

Further, it has been suggested that alternative investment procedures are desirable in order to achieve diversification of investments. This is certainly not necessary for the sake of security of the principal. The advantage of any additional investment returns resulting therefrom (especially considering the disadvantages and dangers of a large fund build-up, as described elsewhere, and that investment results are not important when fund balances are relatively small) seems far more than offset by the disadvantages.

### **Relationship with Railroad Retirement System**

The Railroad Retirement (RR) system (described in detail in Chapter 12) provides benefits similar to those under OASDI for workers in the railroad industry. In virtually all ways, these benefits are more liberal than those under OASDI. The law provides for a coordination of railroad compensation and covered earnings under OASDI in determining not only survivor benefits in all cases, but also retirement benefits for persons with less than 10 years of railroad service. All survivor and retirement benefits involving less than 10 years of railroad service are to be paid by OASDI.

An important element affecting the financing of OASDI arose through amendments made to the Railroad Retirement Act in 1951. The financial-interchange provisions resulting therefrom are designed to place the OASI and DI Trust Funds in the same financial position that they would have been in if there had never been a separate RR program. Each year, computations are made on the basis of a small sample of railroad beneficiaries being completely investigated as to how much the OASDI benefit and administrative expense outgo would have been increased if railroad earnings had been covered under OASDI. This takes into account any OASDI benefit rights ob-

tained by other employment. The additional tax income if railroad employment had been under OASDI is estimated from aggregate RR coverage data. The calculation of the transfers necessary is readily made from these data.

It is estimated by the Social Security Administration that the net effect of these financial-interchange provisions will be a relatively small net loss to the OASDI system. The estimated reimbursements from RR will, over the long run, be somewhat smaller than the net additional benefits paid on the basis of railroad earnings.

It was determined that the "initial amount" due the OASI Trust Fund from the RR Account as of the middle of 1952 was \$488 million.<sup>25</sup> The law provided that interest, but no principal, would be transferred to OASI as long as any part of this initial amount due remained. Then, when the initial amount had been completely eliminated by the annual excesses of additional outgo over additional income under OASDI if railroad employment had been covered thereby, transfers of such excess amounts would occur. Accordingly, each year the interest on the net amount due was transferred from the RR Account to the OASDI Trust Funds. At the same time, the principal was steadily reduced by the aforementioned excess of additional outgo over additional income that was determined under the actual developing experience.

By 1957—largely because of the relatively older age distribution of railroad workers compared with the covered population under OASDI—the entire initial amount had been liquidated. Beginning in 1958, payments have been made each year from the OASI Trust Fund to the RR Account, amounting to \$300–400 million per year in the early 1960s, \$500–700 million annually through 1972, but then increasing each year thereafter, reaching \$1.4 billion in 1980 and \$3.4 billion in 1991.

As to the DI Trust Fund, there was no "initial amount" but rather immediate transfer beginning in 1958. For the first two years, relatively small amounts were paid from the RR Account to the DI Trust Fund. Thereafter, the flow has been in the other direction (at about \$15–30 million per year). In 1980, the situation reversed, and a payment of \$12 million was made from RR to DI. The annual payment from DI to RR was about \$25 million in 1981–85; it increased thereafter and was \$82 million in 1991. Eventually, it is estimated to turn in the other direction (i.e., go from RR to DI).

In the near future, the OASI Trust Fund will continue to make

25. Such "initial amount" was also determined for previous years. It increased from zero at the beginning of 1937 to \$513 million at the end of 1950 and then decreased to the \$488 million figure.

substantial payments to the RR Account. However, after a decade or so, these will become smaller, and, in fact, it is quite likely that after some years the flow of payments will be reversed. This trend will result from several factors—the age distribution of the OASDI coverage will become older, and the effect of duplicating and overlapping benefits will be more significant (i.e., a greater proportion of railroad beneficiaries will also have OASDI benefits in their own right; the financial interchange results in RR getting credit only for the *additional* benefits that would be payable if railroad employment were under OASDI).

### **Appendix 4-1**

#### **Methodology for Actuarial Cost Estimates for Social Security Programs**

Quite naturally, in programs as broad and diversified as social security programs generally, there are no neat mathematical formulas for cost estimates and valuations—just as is the case in connection with the complex pension and employee benefit plans that have developed over the years—compared with the relative simplicity of the actuarial valuation formulas used for individual life insurance and annuity policies. This appendix deals with cost-estimating procedures for all types of social security programs, but the main emphasis is on the cost estimates for the OASDI system. Similar discussion for the Medicare program is presented in an appendix to Chapter 8.

#### **Cost Estimates for Long-Range Social Insurance Programs**

Making actuarial cost estimates for long-range social insurance programs of a pension nature involves a number of problems similar to those encountered in making such estimates and valuations for private pension plans. Conversely, there are many problems peculiar to each. A precise dividing line cannot be drawn, partly because a system may contain certain benefit features characteristic of each.

The OASDI system is clearly social insurance, because it is a national program covering virtually the entire working population, and there is no direct relationship between contributions paid and benefit received. To put it another way, OASDI emphasizes social adequacy at the expense of individual equity.

Another national social-insurance program, the Railroad Retirement system, adheres in considerable measure to the principle of individual equity and thus includes features often found in private

pension plans. For instance, retirement and disability benefits under tier 2 (which, in general, is the benefit layer above the OASDI-like benefits, tier 1) are directly proportional to length of covered service. However, the survivor benefits are similar to those of OASDI.

The federal Civil Service Retirement (CSR) system and the Federal Employees' Retirement System (FERS) (and to a certain extent, many similar plans for state and local government employees) tend to be much closer to a private pension plan than to social insurance. Nevertheless, certain elements of social insurance have been introduced into CSR, possibly because of a fear among certain groups of "encroachment" by OASDI. In many cases, CSR disability and survivor benefits bear little relationship to length of service but rather are based on social-adequacy principles.

This appendix, in discussing the general methodology of preparing and presenting long-range actuarial cost estimates, draws largely upon the procedures of OASDI, but other systems are also considered. In order to lay a foundation for the discussion, there are first considered (1) valuation methods used, (2) variability of cost estimates, and (3) the concept of open-end groups compared with closed groups.

#### *Valuation Methods*

Two methods of presenting actuarial valuations are commonly used. Historically, the most common is the "balance-sheet" method, which to a certain extent follows the format, although not the substance, of standard accounting procedures. The assets and liabilities, both actual and potential, are determined on a given date. Such determination for social insurance systems is usually made not only for present covered workers but also for all future new entrants. On the other hand, for private pension plans the concept is generally on the basis of presently covered workers only. Under one approach, future assets based on the contributions of covered workers and employers are valued on the basis of actual scheduled rates, and the resulting deficit or surplus (in monetary units or as related to payroll) is derived. Under another approach, assets and liabilities are "balanced" by determining the contribution rate needed to achieve this result. Even though the actuarial valuation does not show an actual balance sheet, but rather the resulting annual costs in dollars and in percentage of payroll, one made by this procedure may still be said to be of the balance-sheet type.

The other procedure, the "projection" method, involves a presentation of year-by-year figures in the future for many years (perhaps

at quinquennial or decennial intervals) for such elements as covered workers, beneficiaries, covered payroll, contribution or tax income, interest income, benefit disbursements, administrative expenses, and balance in the fund.

The balance-sheet method has the advantage of ease of preparation, because, in most cases, well-established actuarial techniques permitting the use of existing tables and computational shortcuts may be followed when "static" assumptions for the various cost factors are made. This is particularly important when dealing with small systems, for which extensive work is usually not warranted. On the other hand, when "dynamic" assumptions, such as continuously improving mortality, are used, the projection method may prove less difficult to apply.

Another advantage sometimes claimed for utilizing the balance-sheet method is that it is not necessary to make assumptions for experience extending many years into the future. This is really not the case under either method when, as is customary in connection with social insurance plans, the costs are figured for many years, even sometimes into perpetuity, because of the assumption of continuing groups of new entrants. Under these circumstances, the balance-sheet method may be less realistic, because static future conditions as to new entrants, mortality, retirement rates, and the like are usually assumed.

Nonactuaries often look upon valuations of the balance-sheet type with complete mystification, sometimes even skepticism. Comments are often made that the figures from such valuations are "only actuarial costs and not indicative of real costs." This is probably because the present values of all future benefit disbursements, the only ones shown, are so much higher than current costs. If the projection method is used, such criticism is greatly lessened. The immediate and near-future situation is clearly recognized and portrayed. This, in turn, lends credibility to the graphic picture presented for the more distant future.

One argument often made in favor of the balance-sheet method as against the projection method is that the former must be used when there is limited experience under the system. Under such circumstances, the actuary must use data from the experience of other systems, sometimes even those of other countries. This argument is not valid. An ingenious actuary can use the projection method under almost any circumstances.

In conjunction with cost estimates developed on the projection basis, it is possible to derive "level-premium" or "level-cost" figures, both for benefit and administrative costs and for tax income. (At times in the recent past, this procedure was inappropriately referred to as



the “level-financing” basis; currently, it is quite properly referred to as the “present-value” basis.) The “level-cost” is the percentage of covered payroll that, if charged from the present into the future over the entire period considered in the valuation, would produce sufficient tax and interest income to the fund to meet the cost of the benefit payments and administrative expenses. The “level-cost equivalent of the tax rates” is the percentage of covered payroll that, if charged from the present over the entire period considered in the valuation, would produce the same amount of income to the fund, taking into account interest, as would be produced by the graded schedule of tax rates being considered. The use of these two figures (possibly after taking into account the interest on the existing fund at the time of the valuation and an allowance to build up the fund balance to an appropriate level in the future) gives an indication of the long-range actuarial balance of the system.

In 1972 the procedure of using the level-cost concept was changed to that of “average cost.” The latter as it relates to outgo items is merely the simple arithmetic averaging of the annual costs over all the years in the valuation period, expressed as percentages of taxable payroll. The average equivalent of the tax schedule is merely the average of the tax rates scheduled for each of the years in the valuation period. As to OASDI, no account is taken of the balance in the trust funds at the beginning of the period, or of any future interest income, or of any costs involved in building up the trust-fund balance in future years. The actuarial balance for OASDI is then based on a comparison of the average cost of the outgo with the average equivalent of the tax schedule.<sup>26</sup> The failure to consider interest for payments made at different times is largely counterbalanced by the nonrecognition of the larger dollar costs over the years as the system matures; percentage-of-payroll figures are used. The difference between the two concepts is relatively small, as shown in Table 4.4, but the author believes that the level-cost (or present-value) method is very much preferable.

In the 1988 Trustees Report (and in subsequent ones), return was made to the level-cost method. The Social Security Technical Panel of the 1991 Advisory Council on Social Security endorsed this method, along with the requirements that an allowance be made for the cost of building and maintaining a contingency reserve with a fund balance of 100 percent of annual expenditures at all times throughout the valuation period (see Appendix F).

26. The actuarial status of the HI program is measured in a slightly different manner than is done for OASDI (see Appendix 8–1).

TABLE 4.4. Comparison of Effect in Valuations of OASDI System of Using Level-Costs Compared with Average-Costs (figures in percentages of taxable payroll)

<i>Item</i>	<i>Level-Cost</i>	<i>Average-Cost</i>
<i>Valuation for amendments enacted in mid-1972</i>		
Benefits*	9.79%	9.77%
Taxes	9.87	9.84
Net actuarial balance	+0.08	+0.07
<i>Valuation in 1974 Trustees Report</i>		
Benefits*	13.70	13.89
Taxes	10.82	10.91
Net actuarial balance	-2.88	-2.98
<i>Valuation in 1980 Trustees Report</i>		
Benefits*	13.70	13.74
Taxes	12.18	12.22
Net actuarial balance	-1.52	-1.52
<i>Valuation in 1988 Trustees Report</i>		
Benefits*	13.52	13.82
Taxes	12.94	12.95
Net actuarial balance	-0.58	-0.87

\*Including also the effects of the administrative expenses, the RR financial interchange, and the existing trust-fund balances at the valuation date.

The Technical Panel recommended four additional measures of the financial status of the OASDI program, as follows:

- (1) The year in which the fund balance is exhausted (if any) and the first year in which the fund balance falls below 50 percent.
- (2) The tax-rate and/or benefit changes needed to bring the system into long-range actuarial balance.
- (3) The amount of the transfers to (or from) the General Funds as trust-fund special-issue investments are purchased (or redeemed).
- (4) The difference between the cost rate and the income rate in the last year of the 75-year valuation period (a measure of the ultimate ongoing financial situation).

Actuarial valuations of private pension plans, both in this country and abroad, have almost always been done by the balance-sheet method. On the other hand, the cost estimates for the OASDI system have always been prepared by the projection method. The balance-

sheet method has generally been used for the RR, CRS, and FERS systems, although, at times, projection estimates have been made for these programs. Cost estimates for foreign social insurance programs have usually been made by the balance-sheet method, although in recent years there seems to have been some trend toward the projection method. Countries that have adopted this latter method include Israel, Sweden, and the United Kingdom.

#### *Variability of Estimates*

Long-range actuarial cost estimates and valuations, regardless of type, cannot be precise, no matter how accurately and meticulously prepared. Considerable differences will inevitably arise between actual experience over the long-range future and the estimates. Although the figures cannot be expected to be precise, such estimates must be made to indicate future cost trends. One difficulty in comparing actual experience with previous assumptions is that the underlying program frequently changes as a result of legislative action.

Because of the variations that will almost certainly occur between the actual experience and the actuarial assumptions, it can be argued that cost estimates or valuations serve their purpose best if they are on a "range" basis. This procedure has very definite value, although it involves considerable extra work. Even when the range procedure is followed, a single intermediate estimate is frequently required. This will not necessarily be any more accurate or "probable" than any of the other range estimates. Such a single estimate may, however, be needed for establishing long-range schedules of tax rates or for serving as the best (or most easily understood) measure of the actuarial status of the program.

The actuarial cost estimates for the OASDI system that were developed during 1937–70 were of the range type, although the original estimates for the 1935 Act were on the single-estimate basis. The 1971 Advisory Council on Social Security recommended that "contribution rates should be based on a single, best estimate derived from a single set of assumptions that reflect likely future trends . . . rather than on an average of a low-cost and a high-cost estimate." The council also recommended that other estimates should be made on the basis of variations in the major cost factors. The author does not agree with this procedure, even though in practice it produces about the same result, because one is fooling oneself by believing that a "best" estimate is precisely possible.

The OASDI cost estimates, as presented in the annual Trustees Reports, were on the basis recommended by the 1971 council for several

years, but in recent years there has been a shift back to the range basis. First, there were three independent estimates (designated as Alternatives I, II, and III). These alternative estimates were based on assumptions that vary only in the economic factors of wage and price changes, unemployment and labor force participation rates, and interest rates. In 1981, Alternative II was replaced by two intermediate alternatives (II-A and II-B), which differ only as to economic assumptions. Alternative II-A generally uses the official administration budget assumptions for the short range, whereas Alternative II-B uses somewhat more pessimistic ones (and for the long range as well). Alternative II-B is often referred to as the intermediate estimate and is generally used in discussion of the actuarial status of the program. Alternative I is characterized as being more "optimistic" than Alternative II-A or II-B, whereas Alternative III is more "pessimistic." However, as the panel of actuarial and economic consultants to the 1979 Advisory Council on Social Security pointed out, better terminology would be "low-cost," "intermediate-cost," and "high-cost." In 1991 Alternative II-A was dropped; Alternative II-B was then designated as Alternative II.

#### *Open-End Groups versus Closed Groups*

**Valuation of Insurance Companies.** Valuation of the actuarial liabilities of an insurance company is done completely on the closed-group basis. In other words, it is assumed that there will be no new entrants in the future, so that the existing group of policyholders must "stand on their own feet" financially. This is the method required by law and is the only reasonable and proper basis—as evidenced by the past financial failures of assessment and similar organizations that completely depended for their solvency on new entrants.

**Valuation of Private Pension Plans.** Private pension plans operate under many different financing methods, almost all of which are on the closed-group basis insofar as the financing is considered from a percentage-of-payroll cost basis or when a full balance sheet is presented. It is, of course, true that many such plans are not completely funded at the present time, although definite arrangements are in effect for this to be accomplished at a specific future date. In any event, the vast majority of plans do not anticipate a continual flow of new entrants and an indefinite continuation of the plan to assure financial solvency.

**Valuation of Government-Employee Pension Plans.** The financing basis of the CSR and FERS systems differs somewhat from that of most private pension plans in that an open-end-group technique is followed. Under CSR, before FERS was created, the payroll was assumed to remain level in all future years at the current figure, and static (noninflationary) economic assumptions were used. Interest on the unfunded accrued liability, which in essence was permitted to increase until 1980 (because the full amount of the interest was not paid) and then is "frozen," was measured against this payroll. This cost is thus spread over perpetuity and is added to the new-entrant, or normal, cost to yield the level-premium cost of the program. For example, in the valuation as of September 30, 1977, the normal or new-entrant cost was estimated at 13.73 percent of payroll, and the total long-range level-cost could be estimated to be about 40 percent, of which the employees contribute 7 percent.<sup>27</sup>

The procedure of using static economic assumptions is required by law. The CSR Board of Actuaries, however, recommended that the financing method should be changed such that it would be based on dynamic economic assumptions and that a more appropriate funding method should be used. In particular, the proposed economic assumptions were an investment rate of return of 7 percent, salary inflation (in excess of longevity and promotional increases) of 6.5 percent per year, and CPI increases of 6 percent per year. Thus, the "real" interest rate would be only 1 percent (as compared with the 5 percent in the static-assumptions valuation).

Several funding methods were considered. The one recommended was the entry-age normal-cost method, with the unfunded liability being amortized as a level percentage of payroll over 50–75 years. This differs from what ERISA requires of private pension plans—namely, amortization by level annual dollar amounts over 30–40 years.

The result would be a significantly higher cost than under the existing procedure. The total cost (including the employee contribution of 7 percent) would be 55.1 percent during a 50-year amortization period and 49.6 percent during a 75-year amortization period.

**Valuations of State and Local Retirement Plans.** Most actuarially guided state and local government-employee retirement systems are financed on a closed-group basis, because the unfunded accrued li-

27. See "Fifty-Seventh Annual Report of the Board of Actuaries of the Civil Service Retirement System," House Committee Print No. 96-10, 96th Congress, March 17, 1980.

abilities are intended to be amortized over a definite future period. In many cases, however, the period is so long that there is relatively little difference between this approach and the open-end-group basis, under which a continuous flow of new entrants is assumed, and interest is paid into perpetuity on the “frozen” unfunded accrued liability.

**Valuation of RR System.** The valuations of the RR system and of OASDI and HI are of a truly open-end-group nature—even though the former basically uses the balance-sheet method and the latter uses the projection method. In the latest RR valuation (as of December 31, 1989), four separate valuations were made, differing only by assumptions as to the future employment level in the railroad industry. None of these valuations was designated the “most probable” or “intermediate” one.

For the RR system, a projection of annual taxable payrolls is made for the next 75 years. Wages are assumed to increase at a rate of 3.75 percent per year (versus CPI increases of 3.50 percent). Employment is assumed to decrease significantly over the next 50 years and then level off (at a relatively low figure). This series is equated to an equivalent-level annual payroll that is then used as the basis for the balance-sheet-method computations.

The estimates of future payrolls are based on population projections and estimates of future railroad traffic. On the other hand, for OASDI and HI, the coverage of the system and the resulting payrolls are determined from population projections running for 75 years into the future, with relative stability and maturity assumed thereafter, and on estimated trends in labor force participation rates by age and sex.

The RR valuations, like the OASDI ones, were formerly on a perpetuity basis; both are now on a 75-year basis. For many years, the HI valuations were on a 25-year basis, but beginning with the 1986 Trustees Report, they have measured the actuarial balance over a 75-year period. The shorter period for HI reflects the much greater difficulty involved in projecting its assumptions (i.e., for health-care unit costs and utilization). Under neither system is there any attempt to “freeze” the unfunded accrued liability, as in the CSR system.

**Valuation of OASDI and HI.** The actuarial status of the OASDI system is usually expressed as a percentage of taxable payroll. The same procedure is used for the HI system. Specifically, the 1992 Trustees Report showed the OASDI system to have an actuarial deficit on a long-range basis of 1.46 percent of taxable payroll according to the intermediate-cost estimate (Alternative II) (a surplus of 1.09 percent for the low-cost estimate and a deficit of 4.89 percent for the

high-cost estimate). The corresponding figure for HI was a deficit of 4.20 percent of taxable payroll according to the intermediate-cost estimate (deficits of 1.34 percent for the low-cost estimate and 9.45 percent for the high-cost estimate), based on a 75-year valuation period (as for OASDI). It is also possible to express the actuarial status of OASDI and HI on a balance-sheet basis.

Table 4.5 gives data on the actuarial deficits of the OASDI and HI systems in terms of dollars as of various dates on the open-group basis. Such deficit has a somewhat different basis and meaning than the actuarial-balance concept used in 1971–87, as described previously, largely because the latter does not involve discounting future transactions at interest. Such deficit on a valuation date is (1) the present value of future benefit payments and administrative expenses (both for current beneficiaries and workers and for future entrants) during the valuation period, minus (2) the present value of future taxes for present workers and new entrants and of income taxes on benefits during such period, minus (3) the existing trust fund. (These data are published in the March issues of the *Treasury Bulletin* and also, in more detail as to OASDI, in the various issues of the *Annual Report to the Congress* of the Social Security Administration.)

Under this open-group, limited-period concept, there was a small actuarial surplus for OASDI as of mid-1972, because the system was then estimated to be in close actuarial balance. A deficit of \$176 billion occurred as of mid-1973, when there was a small estimated lack of actuarial balance, but this soared to \$1.3 trillion in mid-1974, when the actuarial lack of balance was almost 3 percent of taxable payroll. The deficit then increased sharply in 1975–77 as the assumptions in the actuarial cost estimates were made more conservative, reaching \$4.8 trillion in 1977. The 1977 Act, however, reduced this deficit by more than 80 percent, to about \$800 billion, as a result of the decoupling of the benefit-computation procedure and the additional financing provided.

The 1983 Act eliminated the deficit for OASDI and, in fact, produced a small (relatively) surplus of about \$150 billion. In the valuations following 1983, the situation became increasingly less favorable, and the small surplus of the 1983 valuation turned to deficits—about \$1.2 trillion in the 1991 valuation (which was still well below the corresponding deficit of \$6.6 trillion under the closed-group basis—see Table 4.1). The reason for this trend was the gradual change in the assumptions involved in the actuarial estimates, so that they became more conservative (e.g., lower real wage growth, longer life expectancies, and lower fertility).

The deficit of \$1,244 billion for the OASDI Trust Funds as of

**424 Part Two Old-Age, Survivors, and Disability Insurance**

TABLE 4.5. Actuarial Status of OASDI and HI on Open-Group, Limited-Period Basis, 1971–91 (dollar figures in billions)

Year*	Interest- Rate Basis†	Present Value of		Existing Trust Fund	Net Deficit*
		Future Outgo	Future Taxes		
<i>OASDI system</i>					
1971	5.25%	\$ 1,185	\$ 1,132	\$41	\$ 8
1972§	6.0	4,717	4,813	44	-140
1973	6.0	5,526	5,306	44	176
1974	6.0	6,532	5,174	46	1,312
1975	7.38	7,071	4,923	48	2,100
1976	6.6	10,510	6,289	44	4,177
1977 (pre-1977 Act)	6.6	11,637	6,810	40	4,787
1977 (1977 Act)	6.6	8,965	8,140	40	786
1978	6.6	10,343	9,379	35	929
1979	6.6	11,060	10,180	33	847
1980	6.08	13,502	12,006	32	1,464
1981	6.08	13,785	12,203	27	1,555
1982	6.08	13,562	11,901	19	1,642
1983	6.08	13,644	13,773	20	-148
1984	6.08	11,656	11,661	32	-37
1985	6.08	12,329	12,020	40	269
1986	6.08	14,468	14,078	46	343
1987	6.08	14,983	14,541	65	377
1988	6.08	15,480	14,712	104	664
1989	6.08	16,493	15,487	157	849
1990	6.08	18,940	17,481	215	1,244
1991	6.39	17,761	16,308	268	1,185
<i>HI system</i>					
1971	5.25%	\$ 276	\$ 140	\$ 3	\$ 133
1972	6.0	272	282	3	-13
1973	6.0	414	428	4	-18
1974	6.0	465	465	8	-8
1975	7.0	551	528	10	13
1976	7.4	706	580	11	115
1977 (pre-1977 Act)	6.6	890	637	11	242
1977 (1977 Act)	6.6	890	656	11	223
1978	6.6	1,027	755	12	260
1979	6.6	1,087	815	13	259
1980	6.08	1,305	992	14	299
1981	6.125	1,608	1,034	18	556
1982		1,675	1,076	21	578
1983		1,685	1,174	26	485
1984		1,652	1,133	17	502
1985		1,433	1,175	21	237
1986		1,673	1,344	39	290
1987		1,662	1,402	51	209



TABLE 4.5 (continued)

Year*	Interest- Rate Basis <sup>†</sup>	Present Value of		Existing Trust Fund	Net Deficit <sup>‡</sup>
		Future Outgo	Future Taxes		
1988		1,757	1,437	66	254
1989		1,966	1,569	85	312
1990		2,340	1,831	98	411
1991		2,533	1,878	115	545

\* As of June 30 for 1971–75 and as of September 30 for 1976–91.

<sup>†</sup> A somewhat higher rate than that shown is used for the first few years (for example, for the 1983 valuation, until 1991).

<sup>‡</sup> Excess of present value of future outgo over the sum of present value of future taxes and existing trust fund. A negative figure indicates a "surplus."

<sup>§</sup> Includes the effect of the 20-percent benefit increase enacted on July 1, 1972 (effective for September 1972).

<sup>||</sup> Varying rates. For example, for 1990, the rate is 8.75 percent in 1990 and decreases each future year until reaching 6.125 percent for 1999 and after. For all years after 1981, the ultimate rate is 6.125 percent.

Note: The valuation period is 75 years for OASDI and 25 years (generally) for HI.

September 30, 1990 was subdivided into \$942 billion for OASI and \$302 billion for DI. About 4.3 percent of the present value of future taxes going to the OASDI Trust Funds was the income from taxation of benefits, with the remainder being the payroll taxes. The present value of future expenditures was subdivided as shown in the next table.

The actuarial deficit for OASDI under the open-group basis tends

Type of Expenditure	Amount (billions)	Percentage Distribution
Benefits for retired workers	\$12,877	68.0%
Benefits for spouses and children of retired workers	814	4.3
Benefits for survivors	2,892	15.3
Benefits for disabled workers	2,036	10.7
Benefits for spouses and children of disabled workers	151	0.8
Railroad Retirement interchange	44	0.2
Administrative expenses	126	0.7
Total expenditures	18,940	100.0

to be much more volatile than under the closed-group basis discussed previously (for which figures were presented in Table 4.1). This is

because the situation under the open-group basis depends to a considerable extent on the amount of taxes that will be paid by new entrants in long-distant future years, when the tax rate is much higher and when the assumed level of taxable earnings under the dynamic economic assumptions is so much higher. In contrast, under the closed-group basis, the taxes considered are almost entirely those to be paid in the next 45 years.

This can be illustrated by considering the actuarial deficits for 1978 under the two concepts. The closed-group concept shows a deficit of \$3,971 billion, compared with only \$929 billion, or 23 percent as much, for the open-group concept. However, the situation is quite different when the several components are considered. In moving from the closed-group concept to the open-group one, the present value of the future taxes is 3.1 times as large, whereas the present value of the future benefits is only 46 percent higher.

As would be expected, when the valuation period for the closed-group concept is lengthened, the resulting net deficit becomes larger (because more of the long-distant future, when costs are higher relative to payroll, is included). For example, for OASDI as of September 30, 1979, the net deficit for a 100-year period was \$1,743 billion, or slightly more than double the corresponding figure of \$847 billion for a 75-year period.

Under the closed-group, limited-period concept, the HI system showed relatively small actuarial surpluses in 1972–74, amounting to roughly \$10–20 billion on this present-value basis, and a small deficit in 1975. This occurred because the program was estimated to be in close actuarial balance under the tax schedules and earnings bases in effect at the time of the valuations, as discussed in Chapters 8 and 10 (see especially Table 10.20). The large deficit shown for 1971 arose because this determination was made before the HI tax schedule was increased significantly by the July 1972 amendments, so as to remedy the previously existing long-range financing problem of this program.

The estimated deficits for HI for 1976 and later years were significantly higher. This resulted from the more conservative assumptions that were adopted about the utilization of HI services. The 1977 Act had relatively little effect on the deficit, because no benefit changes were made, and the intent as to financing purposes was to be neutral (the increased income from the higher earnings bases legislated approximately counterbalanced the small reductions made in the future tax-rate schedule).

Certain legislative changes in 1982–83 favorably affected the cost picture of the HI Trust Fund under the open-group limited-period

basis (e.g., the coverage of all federal civilian employees and of all employees of nonprofit organizations, the higher tax rate for the self-employed—namely, an increase to the combined employer-employee basis—and the new method of reimbursing hospitals). Nonetheless, the deficit for this system remained at about \$500 billion in 1981–83 (after having leveled off at about \$250 billion in 1977–80). The explanation, of course, was the continuing rise in hospital costs—especially in comparison with the general wage level.

Following 1983, the deficit fell to a level of about \$250–300 billion in 1985–89 in all valuations, but then increased to \$545 billion in 1991. The new method of reimbursing hospitals (i.e., on the basis of Diagnosis Related Groups) apparently had a significant favorable effect, and the bankruptcy of the program in the late 1980s which had been envisioned in the early 1980s was apparently postponed to at least the later 1990s and possibly to the first decade of the 2000s.

#### Long-Range OASDI Cost Estimates<sup>28</sup>

##### *Principal Elements and Factors*

The following principal quantities are estimated for various future years and are used in deriving the cost estimates for OASDI.

1. Total population in all geographic areas covered by OASDI, by age groups and sex, for five-year time intervals.<sup>29</sup>
2. Workers covered under OASDI as percentages of total population by age groups and sex.
3. Number of covered workers, derived from items 1 and 2.
4. Average annual creditable earnings of covered workers.
5. Total annual creditable earnings of covered workers, derived from items 3 and 4.
6. Effective annual taxable payrolls, from item 5 (after adjustment for the difference between the employer-employee tax rate and the effective tax rates on amounts in excess of the earnings base

28. For a more detailed description of the methodology of these cost estimates, see Stephen C. Goss, *Long-Range Estimates of the Financial Status of the Old-Age, Survivors, and Disability Insurance Program, 1983*, Actuarial Study No. 91, Social Security Administration, April 1984. For a similar description for the short-range estimates, see Steven F. McKay, *Short-Range Actuarial Projections of the Old-Age, Survivors, and Disability Insurance Program, 1991*, Actuarial Study No. 104, Social Security Administration, 1991.

29. For the latest such projection, see Alice Wade, *Social Security Area Population Projections, 1991*, Actuarial Study No. 106, Social Security Administration, February 1992.

for persons who have more than one employer during a year and for tips).

7. Fully insured population (potentially eligible for retirement or survivor benefits) as percentages of total population, by age group and sex.
8. Fully insured population, derived from items 1 and 7.
9. Population by age groups, sex, and marital status, derived from item 1 and from assumed marriage and divorce rates.
10. Fully insured population by marital status, derived from items 8 and 9 (and also population not so insured).
11. Number of old-age beneficiaries in current-payment status, from fully insured population over retirement age (item 8), reduced to allow for the effect of the earnings test (and also whether actuarially reduced benefits at ages between 62 and the NRA are elected).<sup>30</sup>
12. Number of spouse beneficiaries aged 62 and over, derived from uninsured spouses (item 10) by applying a factor to remove spouses of persons not eligible for old-age benefits (under age 62 or not insured) and spouses receiving pensions from government-employee plans that are not coordinated with OASDI.
13. Number of widow beneficiaries aged 60 and over, derived from uninsured widows (item 10) by applying a factor to remove widows of uninsured husbands and widows affected by the pension offset (as in item 12). Number of widower beneficiaries is derived in the same manner.
14. Number of disabled widow and widower beneficiaries between age 60 and the NRA, derived from uninsured widows and widowers (item 10) by applying factors based on past experience.
15. Number of children of old-age beneficiaries, derived from number of old-age beneficiaries (item 11) by applying factors projected from past experience to account for change in fertility rates.
16. Number of survivor children of insured workers, derived from total child population (item 1) by applying factors representing number of orphans of insured workers as a proportion of the total child population.
17. Number of mothers of child-survivor beneficiaries, derived from number of survivor children (item 16) by applying factors

30. For a more detailed description of the methodology for the determination of the numbers of beneficiaries of all types, see John C. Wilkin, *OASDI Long-Range Beneficiary Projection: 1987*, Actuarial Study No. 100, Social Security Administration, February 1988.

projected from past experience to account for changes in fertility rates. Number of father beneficiaries is derived in the same manner.

18. Number of wife beneficiaries under age 62 of old-age beneficiaries, derived from number of children of old-age beneficiaries (item 15). Number of husband beneficiaries is derived in the same manner.
19. Number of parent beneficiaries, based on past experience.
20. Number of lump-sum death payments, derived from mortality factors applied to insured population (item 8), with allowance for deaths where no eligible survivor is present.
21. Population insured for disability, derived from fully insured population (item 8) by applying factors to account for the more restrictive disability-insured requirements.
22. Population exposed to disability, derived from the population insured for disability (item 21) by removing those already entitled to disability benefits.
23. Number of disability beneficiaries, developed from incidence rates applied to exposed population (item 22) and from termination rates applied to those already entitled to disability benefits.
24. Number of children of disability beneficiaries and number of spouse beneficiaries under age 62 of such disability beneficiaries, developed from projections similar to those listed for auxiliaries of old-age beneficiaries (items 15 and 18). Number of spouse beneficiaries aged 62 and over, derived from number of disability beneficiaries by applying factors based on past experience.
25. Average annual benefit amounts for beneficiaries in current-payment status, projected from current averages, with adjustments for the effects of actuarial reductions in benefits for "early" claims, increases in benefits for delayed retirement, residual auxiliary and survivor benefit payments for those with smaller benefits based on their own earnings record, and reductions in benefits as a result of pensions from noncovered employment.
26. Annual amount of benefits, from average benefit amounts (item 25) applied to number of beneficiaries (items 11–19 and 23–24), after making allowance for the effect of the earnings test, and from \$255 times the number of eligible deaths (item 20).
27. Additional costs due to administrative expenses and costs for vocational rehabilitation, based on past experience. Additional

cost or income due to RR financial interchange, derived from projected RR benefits and administrative expenses reimbursable by OASDI and from RR income payable to OASDI.

28. The income taxes on benefits are estimated on the bases that the rate applicable is the marginal tax rate for the particular individual, that the threshold amounts remain unchanged in the future, and that all dollar elements in the income-tax structure (such as personal exemptions and brackets) rise in accordance with changes in the CPI (because such indexing is provided for in the income-tax provisions).

The Social Security Technical Panel to the 1991 Advisory Council on Social Security reviewed the methodology and assumptions underlying the actuarial estimates for the OASDI program. In general, the Technical Panel found the actuarial work to be highly satisfactory. In the following discussion of the assumptions and procedures, the few instances where the Technical Panel disagreed with the practices followed in the 1990 Trustees Report are cited (see Appendix F for a summary of its recommendations).

#### *Valuation Period*

Until 1965, the valuation period in the OASDI cost estimates was infinite (i.e., covered all future years). Because of the difficulty for some persons in understanding this "infinite" concept, the 1964 Advisory Council on Social Security recommended a change. So, beginning in 1965, this period was limited to the 75 years following the valuation date, which was the maximum life span of the vast majority of covered workers alive then. Although some may question having such a long period, considering the difficulty in making long-range assumptions and the likely variability of the actual experience, this does seem necessary. For one thing, the unusual demographic changes that will almost certainly occur in the next 50 years seem to require such long-term analysis.<sup>31</sup>

It is important to note the effect that occurs from one annual valuation to the next one. All other things being equal, the second valuation will show a slightly higher benefit cost (and, in the event that a rising schedule of tax rates is in the law, a slightly higher average tax rate, although not as much higher as the benefit cost). The reason for

31. Over this period, the number of persons aged 65 or over will increase greatly. At the same time, the population at the working ages will rise much less rapidly, or may even decrease, due to lower fertility than prevailed before 1970 and its likely continuation in the future.

this is that the 75-year valuation period in the later one includes one additional long-distant year of high cost (or of ultimate tax rate) and excludes one current year of low cost (or of low tax rate).

*Earnings Assumptions Used before 1972*

The long-range OASDI cost estimates were based on level-earnings assumptions until 1972. This, however, did not mean that covered payrolls were assumed to be the same each year; rather, they rose steadily as the population at the working ages was estimated to increase. It was assumed that, if in the future the earnings level should be considerably above that which prevailed at the time of the estimate, and if the benefits for those on the roll were at some time adjusted upward so that the annual costs relative to taxable payroll remained the same as estimated for the present system, then the increased dollar outgo resulting would offset the increased dollar income. This was an important reason for considering costs relative to taxable payroll rather than in dollars.

If the general level of earnings were to rise in the future above that assumed in the cost estimates based on level-earnings assumptions, and if all other experience factors closely conform with the assumptions made, then the cost of the program relative to taxable payroll would be lowered. In other words, a savings would be generated that could be utilized to liberalize the benefit provisions—or, perhaps more accurately stated, to keep them up to date. The reasons for these savings were that the method of computing the average wage for benefit purposes extended over the potential covered lifetime (rather than, say, on the final wage) and that the benefit formula was weighted in favor of those with low earnings. (These considerations applied to the “static” benefit formulas applicable before the 1972 Act, which introduced automatic-adjustment procedures.)

In regard to the weighted benefit formula, as earnings would increase (up to the maximum taxable and creditable amount), the tax payable would rise proportionately, but the benefits derived would increase less than proportionately. For example, under the 1973 Act, if a \$300-a-month worker suddenly became a \$400-a-month worker, the taxes would rise by 33 percent; yet the benefit rate for an average monthly wage of \$400 would be only 21 percent higher than for a \$300 wage. Moreover, there was the further dampening factor that under these circumstances the benefit eventually payable would be based on less than a \$400 wage in many instances, because some of the period of the \$300 wages would be used in the calculations.

The same result of a reduction in the cost of the system—or a sav-

ings—would arise in somewhat similar fashion when the maximum earnings base is raised, and the only benefit-provision change would be to extend the benefit table to the additional covered earnings merely by applying the lower factor at the upper end of the formula (20.0 percent) thereto.

It should be kept in mind that in the absence of automatic-adjustment provisions, although the likelihood of rising earnings in the future represented a significant safety factor insofar as the OASDI cash benefits were concerned *if level-earnings assumptions were used*, the reverse was the case for any benefits in kind, such as medical care.

The cost estimates made before 1972 did not take into account the possibility of a rise in earnings levels, although such a rise had characterized the past history of this country. If such an assumption had been used in the cost estimates—along with the unlikely assumption that the benefit structure would not be changed—the cost relative to taxable payroll would, of course, have been lower. If benefits were adjusted to keep up to date with the cost of living and to reflect rising earnings trends, the year-by-year costs as a percentage of taxable payroll might not be greatly affected. In such case, the level cost would be higher, because under such circumstances the relative importance of the interest receipts of the trust funds would gradually diminish with the passage of time. If earnings consistently rose, thorough consideration would need to be given to the financing basis of the system because the interest receipts of the trust funds would not meet as large a proportion of the benefit costs as anticipated.

In a very real sense then, the use of a level-earnings assumption was a safety factor in the cost estimates that would and could (and did) arise to offset any adverse experience of other actuarial factors (although its primary purpose, as indicated previously, was to keep the benefits up to date in the event of rising earnings levels).

#### *Earnings Assumptions Used in 1972–74*

The 1971 Advisory Council on Social Security recommended that the level-earnings assumption should be discarded in favor of assuming increasing earnings. This was done on the grounds that such procedure is more realistic and that it prevents the overstatement of the role of interest earnings of the trust funds. The author does not agree with these arguments against the use of level earnings if such practice is clearly understood (as described previously).

The use of rising-earnings assumptions in connection with a program that has static benefit provisions is incorrect and deceptive as to the true costs. It is inconsistent and unrealistic to use dynamic eco-



nomic assumptions along with static benefit provisions. Nor is it reasonable, or proper, for the actuary to make assumptions that the benefit provisions will be dynamic, and then how they will change.

Nevertheless, a good argument can be made for using rising-earnings assumptions when the system is automatically adjusted as to benefit levels and the maximum taxable earnings base for changes in economic conditions. The advisory council supported such automatic adjustment, as recommended by President Nixon in 1969.

The problem with using rising-earnings assumptions over a long period of years is the sensitivity involved in the relationship between the assumed rate of increase in the earnings level and that in the Consumer Price Index (CPI), which affects the benefit level.<sup>32</sup> When the basis was changed in late 1971, the assumptions made resulted in a large "actuarial surplus," and this was utilized to provide most of the financing for the 20-percent benefit increase legislated in 1972. More discussion of this matter is given in Chapter 10.

In deciding on appropriate assumptions over the long range as to the rates of increase of earnings and the CPI, past data should be examined. Of course, projection for the future from such data should not be made in a purely mechanistic manner. Rather, any changed elements or trends of significance should be taken into account. This does not mean that undue importance should necessarily be attached to any current situation. However, when the current experience differs significantly from the long-range assumptions decided upon, grading in the assumptions over a short period of years is logical.

Table 4.6 presents data on the rates of increase of total wages (i.e., disregarding the effect of the maximum taxable earnings base) and of the CPI since 1937. (Note that the diverse effect of including the self-employed beginning in 1951 is eliminated by considering only wages.) Also, it should be observed that a general economic law is that, over the long run, the difference between the increase in employee compensation per person-hour (cash wages plus fringe benefits) over the increase in the price level is an indication of the increase in productivity. Such difference may be called "the increase in real wages."<sup>33</sup>

Both the absolute and relative differences between the annual rates of increase of wages and the CPI have fluctuated widely over the

32. The sensitivity that was present in the benefit-computation method prior to the 1977 Act has been significantly reduced (and, in fact, virtually eliminated) by the wage-indexing procedure in such law.

33. The increase in productivity is larger than the increase in real wages because of such factors as the extent to which productivity gains are shared with workers, average number of hours worked per week, and relative changes in the proportion of total remuneration that is used for fringe, noncash benefits. In the past 25 years, such increase averaged about 1 percent per year.

TABLE 4.6. Comparison of Annual Rates of Increase in the Consumer Price Index and in Wages\* (measured from previous year to year shown)

Year	<i>Annual Rate of Increase in</i>		(3) = (2) - (1) <sup>†</sup>	(4) = (2) / (1)
	(1) CPI <sup>§</sup>	(2) Wages		
1938	-1.8%	-7.4%	-5.6%	*
1939	-1.4	8.5	9.9	*
1940	0.8	4.6	3.8	5.8
1941	5.1	6.8	1.7	1.3
1942	10.7	14.1	3.4	1.3
1943	6.2	17.8	11.6	2.9
1944	1.7	13.0	11.3	7.6
1945	2.3	4.4	2.1	1.9
1946	8.5	-6.4	-14.9	*
1947	14.4	15.0	0.6	1.0
1948	7.7	8.6	0.9	1.1
1949	-1.0	5.1	6.1	*
1950	1.0	2.4	1.4	2.4
1951	8.0	5.5	-2.5	*
1952	2.2	6.2	4.0	2.8
1953	0.8	5.6	4.8	7.0
1954	0.4	0.5	0.1	1.3
1955	-0.3	4.6	4.9	*
1956	1.5	7.0	5.5	4.7
1957	3.5	3.1	-0.4	0.9
1958	2.8	0.9	-1.9	0.3
1959	0.8	5.0	4.2	6.3
1960	1.6	3.9	2.3	2.4
1961	1.1	2.0	0.9	1.8
1962	1.2	5.0	3.8	4.2
1963	1.2	2.5	1.3	2.1
1964	1.3	4.1	2.8	3.2

years. This often occurred for obvious reasons, such as the effect of wars and their cessation, business depressions and booms, and imposed wage and price controls and their aftermath when removed. The average of the absolute difference between the annual rate of increase of wages and the CPI, which is the gain in real earnings, was 1.1 percent for 1947-89. However, for 1970-79 it was -0.2 percent. In 1980, the CPI rose 13.5 percent, whereas wages increased by only 9.0 percent, so that there was a larger negative differential (4.5 per-

TABLE 4.6 (continued)

Year	<i>Annual Rate of Increase in</i>		(3) = (2) - (1) <sup>†</sup>	(4) = (2) / (1)
	(1) <i>CPI</i> <sup>§</sup>	(2) <i>Wages</i>		
1965	1.7	1.8	0.1	1.1
1966	2.9	6.0	3.1	2.1
1967	2.8	5.6	2.8	2.0
1968	4.2	6.9	2.7	1.6
1969	5.4	5.8	0.4	1.1
1970	6.0	5.0	-1.0	0.8
1971	4.3	5.0	0.7	1.2
1972	3.3	9.8	6.5	3.0
1973	6.2	6.3	0.1	1.0
1974	11.0	5.9	-5.1	0.5
1975	9.1	7.5	-1.6	0.8
1976	5.8	6.9	1.1	1.2
1977	6.5	6.0	-0.5	0.9
1978	7.6	7.9	0.3	1.0
1979	11.5	8.7	-2.8	0.8
1980	13.5	9.0	-4.5	0.7
1981	10.2	10.1	-0.1	1.0
1982	6.0	5.5	-0.5	0.9
1983	3.0	4.9	1.9	1.6
1984	3.4	5.9	2.5	1.7
1985	3.5	4.3	0.8	1.2
1986	1.5	3.0	1.5	2.0
1987	3.6	6.4	1.8	1.8
1988	4.0	4.9	0.9	1.2
1989	4.8	4.0	-0.8	0.8
1990	5.6	4.6	-1.0	0.8

\* Based on Social Security wage-indexing series (see Table 2.18).

† This approximates the gain in real wages in covered employment.

‡ Not meaningful.

§ Based on CPI(W) for 1978 and after.

cent) than the 2.8 percent in 1979, while in 1981 and 1982 there were small negative differentials. The average differential in 1970–83 was -0.4 percent.

Beginning in 1983, positive rates of increase in real earnings once again occurred. The average differential for 1983–90 was 1.0 percent, and this made the average differential for 1970 and after become positive, 0.1 percent for 1970–90.

The official actuarial cost estimates made in 1972–73 assumed that

earnings would increase at an annual rate of 5 percent in all future years (after a short grading-in period) and that the CPI would increase at an annual rate of  $2\frac{3}{4}$  percent. In addition, these estimates included a safety margin of  $\frac{3}{8}$  percent per year applicable on a compound basis to the benefit outgo for all years until 2010. This safety margin was intended to be applicable for all the various elements considered in the actuarial cost estimates. If it were assumed to apply only to the CPI element, then it could be stated that the CPI was assumed to increase at an annual rate of  $3\frac{1}{8}$  percent until 2010 and  $2\frac{3}{4}$  percent thereafter, and that the corresponding assumed increases in real wages were  $1\frac{7}{8}$  percent until 2010 and  $2\frac{1}{4}$  percent thereafter.

Such estimates made in 1974 included no safety margin and used the same assumption as to earnings, but a level 3-percent assumption about the CPI, which by and large averaged about the same as the previous one if the entire safety margin was assumed to be applicable to the CPI element. These assumptions, which involved about a 2-percent difference in the two rates (i.e., 2-percent annual increases in real wages) and a ratio of such rates of 1.67 to 1, seemed reasonable *if the experience of the last three decades was projected to continue in the future, although with some slight closing of the spread between them.*

#### *Earnings Assumptions Used since 1974*

Two expert groups of actuaries and economists, appointed in 1974 by the Advisory Council on Social Security and by the Senate Finance Committee, respectively, particularly examined the assumptions about future changes in prices and wages. The advisory council group concurred, although not unanimously, in the 5-percent and 3-percent assumptions about wage and price increases in the long run, although expressing the views that the 2-percent differential (i.e., productivity) might be somewhat too large and that the level of both the wage and price increases might be somewhat too low. The Senate Finance panel used 6-percent and 4-percent long-range assumptions, although it believed that a differential of  $1\frac{3}{4}$  percent would have been as reasonable as the 2-percent one used.

The ultimate economic assumptions in the cost estimates in the trustees reports for various years are shown in Table 4.7. For the 1976–80 reports, the intermediate-cost estimate used the same *ultimate* assumptions (for 2000 and after in the 1978 and 1979 reports and 2005 and after in the 1980 report)—a  $5\frac{3}{4}$ -percent annual increase in wages and a 4-percent annual increase in the CPI, resulting in a real-wage rate of increase of  $1\frac{3}{4}$  percent per year. This latter rate

TABLE 4.7. Long-Range Economic Assumptions Used in Various OASDI Cost Estimates Contained in Trustees Reports, Intermediate Assumptions

Year of Report	Annual Rate of Increase in		(3) = (2) - (1) <sup>†</sup>	(4) Unemploy- ment Rate
	(1) CPI <sup>§</sup>	(2) Earnings		
1972*	2¾%	5 %	2¼%	*
1973	2¾	5	2¼	*
1974	3	5	2	*
1975	4	6	2	5 %
1976	4	5¾	1¾	5
1977	4	5¾	1¾	5
1978				
Alternative I	3	5¼	2¼	4½
Alternative II	4	5¾	1¾	5
Alternative III	5	6¼	1¼	5½
1979 and 1980				
Alternative I	3	5¼	2¼	4
Alternative II	4	5¾	1¾	5
Alternative III	6	7¼	1¼	6
1981 to 1987				
Alternative I	2	4½	2½	4 <sup>§</sup>
Alternative II-A	3	5	2	5 <sup>§</sup>
Alternative II-B	4	5½	1½	5 <sup>§</sup>
Alternative III	5	6	1	6 <sup>§</sup>
1988				
Alternative I	2.0	4.4	2.4	5.0
Alternative II-A	3.0	4.9	1.9	5.5
Alternative II-B	4.0	5.4	1.4	6.0
Alternative III	5.0	5.9	0.9	7.0
1988 and 1990				
Alternative I	2.0	4.2	2.2	5.0
Alternative II-A	3.0	4.7	1.7	5.5
Alternative II-B	4.0	5.3	1.3	6.0
Alternative III	5.0	5.8	0.8	7.0
1991 and 1992				
Alternative I	3.0	4.7	1.7	5.0
Alternative II	4.0	5.1	1.1	6.0
Alternative III	5.0	5.6	0.6	7.0

\* In addition, a safety margin of ¾ percent per year compounded was applicable to the benefit outgo through 2010.

<sup>†</sup> This represents the assumed rate of increase in real wages.

<sup>‡</sup> Not stated in report.

<sup>§</sup> In the 1983 report, the average unemployment rate was 5.5 percent for Alternative II-B and 6.5 percent for Alternative III. In the 1984-87 reports, such rates for the four alternatives were 5.0, 5.5, 6.0, and 7.0 percent, respectively.

Note: The assumptions made for the first few years after the valuation date were, in all instances, higher than the long-range ones, in order to phase in from the current experience.

is only slightly below the experience of the past three decades, but well above that of recent years.<sup>34</sup>

The panel of actuarial and economic consultants to the 1979 Advisory Council on Social Security recommended a somewhat wider range of ultimate economic assumptions. Such ultimate values for the low-cost, intermediate-cost, and high-cost estimates were 10.25, 6.75, and 3.25 percent, respectively, for annual wage increases, and 8, 5, and 2 percent, respectively, for annual CPI increases. The corresponding real-wage-increases were 2.25, 1.75, and 1.25 percent. It is to be noted that the panel associated the lowest inflationary economic assumptions with the high-cost estimate, whereas the trustees reports follow the reverse procedure (on the ground that the Alternative I estimate is the “optimistic” one). As the panel correctly points out, for a given real-wage-increase assumption, the resulting costs in relation to taxable payroll are somewhat lower when there is higher inflation, and therefore high-inflation assumptions should be associated with the low-cost estimate.

The 1981 Trustees Report introduced a fourth estimate, shown as Alternative II-A, which is based on lower-cost assumptions than the intermediate-cost estimate (Alternative II-B), but higher ones than the low-cost estimate (Alternative I). The real-wage increases in the three continuing estimates were  $\frac{1}{2}$  percentage point lower in each case, being 1.5 percent for the intermediate-cost estimate. The reports for the next six years continued to use these assumptions.

In the reports for 1988–90 the assumed rates of increase in earnings were slightly lowered (all other economic assumptions being left unchanged). As a result, the assumed increases in real wages were reduced, with the assumption in the intermediate-cost estimate being a rate of 1.3 percent per year. Interestingly, this was done at the same time that the actual experience as to real-wage increases was favorable (see Table 4.6, which shows such increases to average 1.7 percent per year for 1983–87). However, for 1988–89, the experience turned around—with the average change in real wages being virtually zero. This shows the great variability in this element and thus the difficulty in making good assumptions therefor.

The Technical Panel of the 1991 Advisory Council on Social Security recommended that the ultimate real-wage differential used in the intermediate-cost estimate (which it termed the “best estimate”) should be lowered from 1.3 percent to 1.0 percent and that the corresponding assumptions in the low-cost and high-cost estimates should be 1.6 percent and 0.4 percent respectively (see Appendix F).

34. Appendix 4-3 gives some contrasting views of these assumptions.

Further, the Technical Panel recommended that the ultimate inflation rate in the intermediate-cost estimate should be increased from 4.0 percent to 5.0 percent and that such rates for the low-cost and high-cost estimates should be 3.0 percent and 7.0 percent respectively. It also recommended that the ultimate real interest rate in the intermediate-cost estimate should be increased from 2.0 percent to 2.8 percent and that such rates for the low-cost and high-cost estimates should be 3.3 percent and 1.5 percent respectively. The Technical Panel also recommended that the Alternative II-A estimate should be eliminated.

All of the foregoing recommendations of the Technical Panel were adopted in the 1991 Trustees Report and continued in the 1992 Trustees Report, except for the base inflation rates. The author believes that such reduced spread between wage and price increases, or gain in real earnings, as was used in the 1991 Trustees Report, is reasonable. This is the case, not primarily because of the experience in the 1970s (when, on the whole, the two rates increased in about the same manner), but rather due to other factors that seem to be permanent and represent real changes from the past. These include the following factors that will tend to bring the trends of the two rates closer together:

1. The growing scarcity of raw materials and the higher prices relatively that will have to be paid to the developing countries that supply them.
2. The costs to promote ecology, because having cleaner air, water, and general environment requires more expense to produce a given item. The same is true with respect to the costs of programs requiring more extensive (and costly) safety provisions, such as OSHA.
3. Changes in lifestyles and attitudes, so that workers are more concerned with leisure and pleasant working conditions than with productivity and income (i.e., the lessening importance attached to the work ethic).
4. The increasing proportion of service industries, for which productivity increases are more difficult to achieve.
5. The decreasing proportion of the remuneration of employees that is paid as cash wages, with more as fringe benefits, so that the difference between increases in cash wages and increases in the CPI will be lower than such increases between total remuneration and the CPI (i.e., productivity increases).
6. The decreasing average workweek, which results in less rapidly increasing *annual* wages, on which benefits are based.

As a result, the author believes that the spread between annual increases in earnings and in the CPI over the long-range future will not be quite so large as is currently assumed in the official actuarial cost estimates. Such assumed differential should, the author believes, be 1.0 percent (or perhaps even slightly lower). If this were to be done, the result would be slightly higher costs relative to taxable payroll than those shown in the official estimates.

The economic assumptions for near-future years are developed by slowly blending in from the recent experience to the ultimate assumptions. The assumptions for the first few years for the Alternative II-A estimate, which was used in 1981–91, were those used by the Office of Management and Budget for general federal budgetary matters. Because of the chaotic economic conditions of the last few years, the short-range assumptions made for recent trustees reports have varied widely (see Table 2.19).

#### *Labor Force Participation Rates*

Labor force participation rates (actually, the proportions of the population with any OASDI earnings credits in the particular year) are projected by age and sex for various future years.<sup>35</sup> Under Alternative II-B of recent Trustees Reports (now Alternative II), the male rates (which are about 95 percent at ages 25–44) are assumed to remain relatively unchanged under age 45 and to decrease slightly at the older ages. For women, significant increases over the years are assumed for all ages under 60. Broadly speaking, the ultimate female rates are about 20 percent lower than the male ones, compared with a differential of about 30 percent currently.

The trends in the projected rates for Alternatives I and III are quite similar to those under Alternative II.

#### *Unemployment Assumptions*

Another element of importance in the actuarial cost estimates for OASDI is the assumption about the rate of unemployment. This relates, of course, to the “other side of the coin”—the extent of covered employment (and thus taxable and creditable earnings). However, the cost effects of higher unemployment can be greatly overstated—as they have been in the past by some politicians and economists.<sup>36</sup>

35. For a more detailed discussion of this subject and of other economic assumptions, see Stephen C. Goss et al., *Economic Projections for OASDI Cost Estimates, 1987*, Actuarial Study No. 101, Social Security Administration, May 1988.

36. For a more detailed discussion of this matter, see the paper referred to in footnote 1 of this chapter.



For example, if the unemployment rate doubles by going from 4 percent to 8 percent, this would not mean that taxable payroll would be halved. Rather, covered employment would drop from 96 percent of the labor force to 92 percent—a decrease of only 4.2 percent. Taxable payroll would probably decrease slightly more than 4.2 percent, though. This would occur because the labor force would shrink due to some persons ceasing to look for a job and because there would be shorter workweeks for those employed, although offsetting this somewhat would be the fact that those who become unemployed would probably be at the lower earnings levels. Then, too, it should be considered that, with higher unemployment, not only is tax income to OASDI lower, but also future benefit liabilities will be decreased because of fewer earnings credits.

Table 4.7 sets forth the unemployment rates assumed in various recent trustees reports for the ultimate or long-range situation. This assumption was always 5 percent for the intermediate-cost estimate until the 1983 report, for which it was increased to 5½ percent—and then to 6 percent in the 1984 and later reports.

#### *Mortality Assumptions*

The actuarial cost estimates for OASDI have, ever since those made in 1935, made allowance for improving (i.e., decreasing) mortality in future years. In recent years, as current experience seemed to indicate, lower mortality (which produces higher OASDI costs) was assumed in several trustees reports as compared with that used previously. This was done in the cost estimates of the 1974–84 reports.<sup>37</sup> When the Alternative II cost estimate was replaced by Alternative II-A and II-B in 1981–90, the same demographic assumptions were used for both.

The projected age-specific mortality rates have generally been slightly reduced in each successive report, reflecting the continuing favorable experience in the country. The assumed rates used in the 1991 report in the intermediate-cost estimate result in an aggregate decrease in mortality of 3.5 percent from the 1990 level by 2065.

#### *Fertility Assumptions*

In the same manner, the assumptions about future fertility are significant with regard to the cost estimates for OASDI. The general

37. For more details on the actual rates used and how they were derived, see Actuarial Studies Nos. 72, 76, 77, 78, 82, 85, 88, 92, 95, 97, 99, 102, and 105, Social Security Administration.

procedure in recent years has been to grade the fertility assumptions from the current experience to some assumed ultimate level. The measurement of fertility is accomplished through the consideration of the so-called total fertility rate (the average number of children born to a woman during her lifetime). A rate of about 2.1 represents exact replacement of the population (or, exclusive of migration, zero population growth).

In the 1973 Trustees Report (and several preceding ones as well), the total fertility rate was assumed to level off ultimately at 2.55 in the intermediate estimate.<sup>38</sup> Recognizing the much lower fertility that began to be experienced in the early 1970s, new assumptions were incorporated into the cost estimates of the 1974 Trustees Report, with an ultimate total fertility rate of 2.1 being used, which resulted in higher costs being shown for OASDI. In the 1976 Trustees Report, the ultimate total fertility rate assumed for the intermediate-cost estimate was lowered to 1.9, which is well below the replacement level but, on the other hand, somewhat above the then-current level of 1.8.<sup>39</sup> The 1977 Trustees Report reverted to an ultimate fertility assumption of 2.1 in the intermediate-cost estimate,<sup>40</sup> the resulting reduction in the cost of OASDI being almost exactly counterbalanced by the increased cost due to new mortality assumptions. The 1978 to 1982 Trustees Reports continued these fertility assumptions for the intermediate-cost estimate.<sup>41</sup>

The 1983 Trustees Report lowered the ultimate fertility rate assumed for the intermediate-cost estimate to 2.0 (to be reached in 2010, by gradual increases from the 1983 level of about 1.85). The 1984–87 reports continued this assumption. The 1988–92 reports contained a decreased ultimate fertility rate—namely, 1.9 in the intermediate assumption. It is significant to note, however, that the actual experience as to the fertility rate in recent years has been a slowly increasing trend, and in 1990 the rate was about 2.05.

Although the future course of fertility is difficult to predict, an ul-

38. These fertility assumptions were developed in the mid-1960s and were significantly lower than those then being used by the Bureau of the Census, which had four alternative series. The ultimate total fertility rates of these four series were 3.35, 3.10, 2.775, and 2.45.

39. Despite the ultimate assumption of below-replacement-level fertility, the total population would not necessarily eventually decline (and become extinct eventually), because the assumed immigration might be sufficient to prevent this from occurring.

40. The ultimate total fertility rate assumed in the low-cost estimate was 2.3, while that in the high-cost estimate was 1.7.

41. The ultimate total fertility rates assumed in the low-cost and high-cost estimates were 2.3 and 1.7 respectively in the 1977 and 1978 Trustees Reports; 2.5 and 1.5 respectively in the 1979 and 1980 reports; 2.4 and 1.7 respectively in the 1981 and 1982 reports; and 2.3 and 1.6 respectively in the 1983 and 1984 reports.

timinate rate of about 2.1 seems reasonable. This is supported not only by general reasoning (that the population should, over the long run, be self-sustaining) but also by current birth expectations of American women. The Current Population Survey of the Bureau of the Census in each year in 1976–78 reported that the average number of lifetime births expected by all women aged 18–34 was slightly in excess of 2.1 per capita, although being slightly less than this for those aged 18–24 (see: “Fertility of American Women: June 1978,” *Current Population Reports*, Series P-20, no. 330, September 1978). In any event, it should be realized that, if fertility is low, it is very likely that immigration (what might be said to be another form of fertility) will be correspondingly higher.

#### *Immigration Assumptions*

For many years before the 1987 Trustees Report, future net immigration had been assumed to be 500,000 per year for the intermediate-cost estimate (700,000 for the low-cost estimate and 300,000 for the high-cost estimate). Such assumptions were predicated on there being no illegal immigration in the future (although much had occurred in the past).

Thereafter, the assumptions were revised to include illegal immigrants. In the 1990 Trustees Report, the assumptions were 600,000 in the intermediate-cost estimate, 750,000 in the low-cost estimate (which the Technical Panel recommended should be increased to 900,000), and 450,000 in the high-cost estimate. The assumptions were increased in the 1991 Trustees Report to reflect legislation enacted in 1990—to 750,000 for the intermediate-cost estimate (and to 1.0 million and 0.6 million for the low-cost and high-cost estimates respectively); these were continued in the 1992 report.

#### *Disability Assumptions*

The assumptions made about disability incidence and termination rates have an important effect on the cost estimates for DI. Disability incidence rates appeared to stabilize during the 1960s, but they rose significantly in the 1970s.<sup>42</sup> As a result, it was necessary to change the assumptions in this area several times.

42. For more details on this subject, see Bruce D. Schobel, *Experience of Disabled-Worker Benefits under OASDI, 1974–78*, Actuarial Study No. 81, Social Security Administration, April 1980 and William B. Kelley and Esperanza Lopez, *Disabled-Worker Projections for OASDI Cost Estimates, 1984*, Actuarial Study No. 93, Social Security Administration, November 1984.

In the 1973 Trustees Report, the disability incidence rates were increased over those previously used, which had been based on the experience in the mid-1960s; about two-thirds of the increase in the disability incidence rates that had occurred was recognized for long-range cost purposes. The 1974 Trustees Report used projected disability incidence rates at about the level of the 1973 experience. The disability incidence rates were again increased in the 1975 Trustees Report by being based on the 1974 experience, with projected increases at a rate of 3 percent per year for the next five years. At the same time, the termination rates were adjusted to reflect recent experience, which also resulted in an increase in the estimated cost of DI.

With the disability experience continuing to deteriorate, the assumptions in the 1976 Trustees Report were further tightened. The disability incidence rates were increased to recognize the 1975 experience, and then projection was made to 1986 by assuming a 33-percent increase over that 11-year period. The 1976 Trustees Report used somewhat lower termination rates based on more recent experience, and this resulted in a further increase in the estimated cost of DI.

The 1977 Trustees Report used slightly updated (and thus higher) incidence rates but completely new (and lower) termination rates. The result was significantly higher costs being shown.

The 1978 Trustees Report recognized the apparent leveling-off of disability awards in 1976–77 by reducing, for the first time in a number of years, the assumptions about disability incidence rates. Those used for the immediate future were based on the 1977 experience. However, the assumed increases over future years were not as large as in the previous reports—namely, only a 25-percent increase in the rates over a 20-year period, instead of a 33-percent increase over an 11-year period. The termination rates were only slightly changed.

The much lower disability incidence rates after 1975 were recognized in the 1979 Trustees Report. The future rates were projected from the current 1978 experience, adjusted downward for the younger ages (to reflect the effect of the decoupling procedure in the computation of benefits for such persons as a result of the 1977 Act), on the assumption that the rates would increase by 10 percent in the next two decades. The termination rates were based on the experience in 1973–77 and were thus only slightly different than in the previous two reports.

The panel of actuarial and economic consultants to the 1979 Advisory Council on Social Security recommended lowering the assumed future disability incidence rates, which was done in the 1979 Trustees

Report. The panel, however, recommended using a range in such rates for the low-cost, intermediate-cost, and high-cost estimates, varying from no increase over the current experience to an increase of 20 percent. Although the 1979 Trustees Report did not adopt this procedure, it did present a separate sensitivity analysis along these lines for all other factors being maintained as in the intermediate-cost estimate. The panel agreed with the disability termination rates used in the report.

The continuing favorable disability experience was recognized in the 1980 Trustees Report by a further lowering of the disability incidence rates and by increasing the disability termination rates. Nonetheless, an element of conservatism was retained by assuming in the intermediate-cost estimates that the long-range experience would be somewhat above the level experienced in 1978–79 (about 10 percent). The low-cost estimate assumed that the experience would be slightly below the 1978–79 experience level.

Again, in both the 1981 and 1982 Trustees Reports, the favorable experience (from a cost standpoint) was recognized. The incidence rates were decreased in both years; the termination rates were increased in the 1981 report. However, in the 1983 report, the ensuing experience indicated the need for recognizing possible higher ultimate costs; the incidence rates were increased (with the ultimate rates in the intermediate-cost estimate being assumed to be 15 percent higher than the current ones); on the other hand, the termination rates were decreased (being based on the experience of 1977–80—the same rates for the mortality component, but 20 percent higher for the recovery component).

The 1984 Trustees Report further recognized the possibility of higher disability-benefit costs, as a result of the current experience moving in this direction due to public and congressional complaints about the strict administration of the DI program, especially as to the continuing disability reviews, which were prescribed by the 1980 Act. The incidence rates were increased, with those in the short run being based on the experience in 1979–83 (instead of 1980–82, as in the 1983 report). The ultimate incidence rates for the intermediate estimate were assumed to be 25 percent higher than the current ones. The same termination rates were used as in the 1983 report.

In the 1985 Trustees Report, the disabled-life mortality rates were assumed to decrease over time (instead of being unchanged), similar to the assumption for general population mortality. Then, in the 1986–91 reports, small modifications were made in the assumed incidence and mortality rates that, generally, resulted in somewhat higher costs (in part, to recognize the AIDS situation). However, in the 1992

report, significant increases in the incidence rates and decreases in the terminations rates were made, reflecting recent experience. The result was a substantial reduction in the long-range actuarial balance of the DI system.

#### *Interest-Rate Assumptions*

In the 1985–90 Trustees Reports, the real interest rate (i.e., nominal rate, minus the rate of increase of the CPI), which is used to project the trust-fund balances, was assumed to be 2.0 percent ultimately (after about a decade) for the intermediate-cost estimate. Such rates were 3.0 and 1.5 percent, respectively, for the low-cost and high-cost estimates (and 2.5 percent for the now-defunct Alternative II-A estimate). In the 1981–84 reports, each of these rates was 0.1 percent higher. The 1991 report changed the rate only for the intermediate-cost estimate—to 2.3 percent (as recommended by the Technical Panel to the 1991 Advisory Council on Social Security); this was continued in the 1992 report.

#### *General Methodology for OASDI Cost Estimates*

The long-range actuarial estimates for OASDI involve, as a first step, projections of the total population of the United States, including not only the 50 states and the District of Columbia, but also Puerto Rico, the Virgin Islands, Guam, the Northern Mariana Islands, American Samoa, and armed forces and civilians temporarily outside the United States, because all of these categories are affected by the provisions of the system. The basic population projections, subdivided by age and sex, are prepared for five-year intervals.

Certain subpopulation groups are obtained from the basic population projections by applying projected percentage factors obtained from consideration of past data and trends. Among the more important subpopulations derived are the “covered population” (persons having any OASDI-covered employment during the particular year), the “fully insured population” (persons fully insured in the middle of a particular year), the married male population aged 62 and over, and the female population aged 60 and over, subdivided according to age and marital status.

The basic cost quantities—taxable payrolls, payroll-tax receipts, income taxes on benefits, and benefit expenditures—are projected from these subpopulations and from average earnings and benefit patterns. As a final step, the projected trust-fund balances are obtained, using the given tax rates and the hypothesized interest rates.

Similarly, "level-costs" or "average-costs" can be obtained to give a summarized view of the actuarial status of the system.

The procedure may be considered in more detail. First, with respect to the computation of taxable payroll, the earnings assumptions when applied to the covered population produce the "credited payroll" (covered annual earnings not in excess of the earnings base prescribed by law). The credited payroll is then adjusted to reflect (1) the lags in actual payment of taxes from the time the earnings were received and (2) the employer taxes on individual wages in excess of the earnings base for persons working for more than one employer during the year. Such "excess" earnings are not creditable for benefits, and the employee taxes on them are refundable (through being claimed on the income tax return); the employer taxes on such earnings are not refundable. The appropriate tax rates for the employer and employee combined are then applied to the adjusted credited payroll.

The estimated transfers to the trust funds of the proceeds from the income taxes on benefits are obtained by considering the income-tax provisions in present law (and as indexed for the future) and the distribution of benefits by size as related to distributions of general income. Special account must be taken of the fact that the thresholds are not indexed but that earnings (and other income as well) are assumed to increase in the future.

The numbers of old-age or primary beneficiaries (retired workers) in current-payment status come from the total insured populations over the minimum retirement age, after reduction for individuals who are earning more than the earnings test permits. Average Primary Insurance Amount (PIA) patterns computed with reference to various patterns of earnings, when applied to this group, give total old-age-benefit disbursements. Special treatment, however, is necessary to recognize the actuarial reductions in benefits applicable for those claiming benefits at ages 62 to the NRA, the Delayed-Retirement Credits for those who have benefits withheld after the NRA due to the earnings test, and the reduction in benefits for those with pensions from noncovered employment.

Application of the proportion of the number of males who are married to wives aged 62 or over to the number of male old-age beneficiaries in current payment status gives the gross number of wife beneficiaries with respect to retired workers. This gross number, however, must be adjusted for wives who have already been included as old-age beneficiaries on the basis of their own earnings. For the latter group, allowance is made for those cases where the full wife's benefit exceeds her primary benefit, so that the difference is payable as a

partial wife's benefit. The total disbursements for wife's benefits are obtained by multiplying the numbers of such beneficiaries by the average benefits. The full amount, when payable, is 50 percent of the PIA. A lower average is, of course, used for wives who receive only a partial wife's benefit because of having a primary benefit based on their own earnings or having a government-employee pension from their noncovered work. Furthermore, reductions in the wife's average benefit are made to allow for women who are under the NRA when their husbands retire. This group is assumed to apply for the actuarially reduced wife's benefit payable at age 62 or after when they are first eligible therefor.

The widow's benefit is basically in an amount equal to the PIA of the deceased worker and is payable upon attainment of the NRA if the widow has not remarried, or at a reduced rate if first claimed between age 60 and the NRA. The number of widow beneficiaries is obtained from the estimated number of widows in the population, by eliminating those whose husbands had not been insured at time of death. Comparison of the overall results with the appropriate subpopulations is made to assure consistency. Just as in the case of wife's benefits, an adjustment is necessary to allow for widows who have acquired primary benefits on the basis of their own work history or who have a government-employee pension from their noncovered work. Adjustment is necessary for those claiming benefits between age 60 and the NRA, because "actuarial reduction" is applicable to widow's benefits (and also for disabled widows at ages 50–59).

The number of child beneficiaries of old-age beneficiaries is obtained by multiplying the number of old-age beneficiaries by appropriate ratios developed from actual experience, subdivided by age groups. The number of child-survivor beneficiaries is estimated from the total child population by projecting the proportions of such children who are orphans of insured workers. These proportions are obtained through intermediate steps involving the use of life-table techniques to estimate the total orphan population in the country in various future years, with further adjustment to develop the proportions having insured parents. The disbursements for child's benefits are obtained by multiplying the numbers of such beneficiaries by the average benefits, which are computed by taking into account the trends in the PIAs and the proportion of the PIA received, depending upon the number of children in the family.

The mother of a child receiving child's benefits is eligible for mother's benefits. The number of such beneficiaries is obtained by multiplying the number of child beneficiaries arising from male insured workers by a factor derived from actual experience. This factor



reflects the important fact that many of these mothers engage in substantial employment and so forgo their benefits because of the earnings test. The average mother's benefit is determined from the appropriate average PIA and the proportion that the mother's benefit represents of the PIA, after allowing for the effect of the family-maximum provision on the combined child's and mother's benefits for a particular family.

Corresponding benefit disbursements for men (i.e., husband's, widower's, and father's benefits) are estimated on an approximate, rough basis. This is done because they are of such relatively small magnitudes (due to the effects of the earnings test, the "antiduplication of benefits" provision, and the provision offsetting government-employee pensions against spouse's benefits in certain circumstances).

The amount of lump-sum death payments is obtained by computing the numbers of deaths among the insured population in a particular year, reducing the result to allow for those cases where the benefit is not payable, and multiplying the resulting eligible deaths by \$255 (which is the benefit amount in all cases).

Monthly disability benefits are payable to persons who have the required insured status. Supplementary benefits are also available for spouses and children under the same circumstances as for old-age beneficiaries. Disability incidence rates, by age and sex, are applied to the estimated exposed populations to obtain the new cases. These are then projected by termination rates (for death, recovery, and attainment of the NRA) to yield the disability beneficiary roll.

The disbursements for disability benefits are obtained by applying average PIAs to the derived numbers of beneficiaries. The number of spouse and child beneficiaries with respect to disability beneficiaries, and the total amount of their benefit payments, are derived in a manner paralleling that used with respect to old-age beneficiaries.

It is much more difficult to select reasonable assumptions for disability cost estimates than to make assumptions for programs providing only retirement and survivor benefits. The latter are influenced by such factors as mortality and retirement rates, which can be accurately estimated within a relatively narrow range of variation. On the other hand, rates of becoming disabled and rates of mortality and recovery for disabled persons are subject to wide fluctuations, being affected by such elements as interpretation of the definition of disability, economic conditions, public awareness of the benefits available, and the psychological outlook of the covered persons. In fact, it has been stated, quite properly, that the potential disability costs can be determined only by instituting the plan and then studying its experience. But this must be qualified to the extent that the early

experience is not necessarily sufficient to give a complete, accurate picture—as many past disability experiences have evidenced. Even after a number of years of operation, the experience of a disability-benefits plan can change drastically due to economic conditions or other factors, as has been the case in the DI program since 1970 (as discussed in more detail in Chapter 10).

#### *Determination of OASDI Tax Schedule*

The OASDI tax schedule is reviewed from time to time to determine the actuarial status of the system. This then gives an indication of whether the tax schedule should be revised because of the actual experience or because of any modifications deemed appropriate in the assumptions used in forecasting the experience. A similar review is also undertaken when major amendments in the benefit or other provisions are under consideration.

The first step in reviewing the schedule of tax rates is to estimate the disbursements for benefit payments and administrative expenses and the proceeds from the income taxation of benefits for many decades into the future. The next step is to convert the figures for outgo into percentages of taxable payroll for the various years. Then, the proceeds from the income taxation of benefits expressed as a percentage of taxable payroll are deducted so as to determine what the yearly tax rates would be if the financing were solely on a pay-as-you-go basis. The third step is to compute the average-cost of this net outgo expressed as a percentage of taxable payroll over the valuation period.<sup>43</sup>

Finally, there is computed the estimated average equivalent of the tax rates, which is the percentage of covered payroll that is equal to the arithmetic average of the tax rates for all years in the valuation period. If this estimated level equivalent of the tax rates differs considerably (more than any empirically decided-upon margin of allowable deficit or surplus, as the case may be) from the estimated level-cost of the net disbursements after deducting the receipts from

43. Before the 1976 Trustees Report, adjustments were made for interest earnings of the trust fund and for any needed buildup in the size thereof. Specifically, there was deducted the estimated average equivalent of the interest earnings on the amount in the trust fund as of the date of calculation, expressed as a percentage of taxable payroll. Then, there was added the corresponding figure representing the amounts necessary over the years to build up the trust-fund balance so that its size at the end of the valuation period would be equal to one year's outgo. This procedure continued to be followed for HI, except that the ultimate balance desired was 6 months' outgo. In the 1991 Trustees Reports for the first time, both HI and OASDI are evaluated by properly considering the interest earnings of the trust fund and the "mandated" buildup thereof (to a balance of one year's outgo at the end of the valuation period).

the income taxes on benefits, then adherence to the traditional financing basis for OASDI would require a compensating change in the tax schedule. This same procedure has been applied, not only when the existing system is being reviewed, but also when a “package” of proposed changes is being examined. It is significant to note, however, that this principle was not adhered to in the 1977 Act—and most unfortunately so, in the author’s opinion—but it was followed in the 1983 Act.

Tables 10.17 and 10.18 present data on such valuations for OASDI in previous years, while Table 4.5 shows these results for certain recent years in terms of dollars on a present-value basis.

## Appendix 4-2

### Interest Rates and Durations until Maturity of Special Issues of Investments of OASDI Trust Funds<sup>44</sup>

In 1940–43, the new special issues were for durations of four or five years. Beginning in 1944, some new special issues were for durations of one year (or less); beginning in 1945, all new special issues were of this duration. Accordingly, beginning in 1947, the entire investment portfolio was reinvested each year (on June 30). This procedure was followed until 1957, when a transition was begun toward spreading the investment portfolio of each of the trust funds over the following 10 years. Investments during a fiscal year were made in certificates that matured at the end of such year—June 30. At that time, the funds from the maturities were reinvested in long-term notes (up to seven years until maturity) or bonds (of seven years or more).

Then, in 1959, the permanent portfolio of special issues was spread more or less equally over the next 15 years, and this principle was followed until the late 1960s. In order to be equitable to the trust funds as interest rates rose above  $4\frac{1}{4}$  percent then, this principle was suspended, and new special issues were given a maturity of seven years, because other provisions of law prohibited a higher rate than  $4\frac{1}{4}$  percent for longer-term securities. Such prohibition was removed insofar as the trust funds were concerned in mid-1974. Then, blocks of special issues at an interest rate of  $7\frac{3}{8}$  percent were purchased with the funds then available for investment, in equal amounts maturing in each year of 1981–89.

The National Commission on Social Security Reform recom-

44. For more details, see Robert J. Myers, “Investment Policies and Procedures of the Social Security Trust Funds,” *Social Security Bulletin*, January 1982.

mended, in essence, that the special issues should have only a one-month term. Both the House and Senate versions of the 1983 Act also provided for this. However, as discussed in Chapter 2, in a most unusual procedure, the joint conference committee dropped this provision from the final bill.

The special-issue interest rate was initially  $2\frac{1}{2}$  percent (in 1940), but as large volumes of long-term government bonds were floated to finance the war effort, the rate gradually decreased and reached a low of  $1\frac{7}{8}$  percent in the period from May 1943 to July 1946. Thereafter, there was a gradual rise to  $2\frac{5}{8}$  percent for the period from July 1958 to September 1960, which was the last month before the new basis provided by the 1960 Act went into effect.

When the interest basis was changed by the 1956 Act (effective for October 1956), there was no change in the rate actually made available to the trust funds. As it happened, under the conditions prevailing at that time, the new method of basing the rate on long-term obligations (rather than on all obligations) produced a slightly lower unrounded rate, but the change in the rounding procedure produced a final result that was exactly the same as the previous basis.

The new basis under the 1960 Act produced a sharp increase in the special-issue interest rate, yielding rates of  $3\frac{7}{8}$  to 4 percent for issues purchased in the last three months of 1960, or appreciably in excess of the  $2\frac{3}{4}$ -percent rate that would have been in effect then under the old basis. During 1961–65, this interest rate was generally between  $3\frac{3}{4}$  and  $4\frac{1}{4}$  percent, but thereafter it rose significantly, reaching a high of  $7\frac{7}{8}$  percent in February 1970. Then the rate fell somewhat and was about 6 percent during 1971–72, but rose to a peak of  $8\frac{1}{8}$  percent in September 1974, but fell off to about 7 to  $7\frac{1}{2}$  percent thereafter through 1977. In 1978, the rate increased and was as high as  $10\frac{1}{2}$  percent in late 1979. It then increased sharply in early 1980, peaking at  $15\frac{1}{4}$  percent in October 1981. Then, the rate gradually decreased, fluctuating between roughly  $10\frac{1}{2}$  to 13 percent until mid-1985. Thereafter, the rate dropped to a level of about 8 to 9 percent and was  $8\frac{1}{8}$  percent in the first six months of 1991 and then fell to  $7\frac{3}{8}$  percent in June 1992.

### **Appendix 4-3**

*Comments on Economic Assumptions in  
Actuarial Cost Estimates for OASDI*

Nancy H. Teeters (then a Senior Fellow at the Brookings Institution and later a member of the Federal Reserve Board) published a paper

"The Payroll Tax and Social-Security Finance" (a chapter in *Broad-Based Taxes: New Options and Sources*, edited by Richard A. Musgrave, published by the Committee for Economic Development, Johns Hopkins Press, Washington, D.C., 1973). Dr. Teeters commented on the economic assumptions used in the actuarial cost estimates underlying the 1972 amendments to the Social Security program. She pointed out that, for the period up to 2010, the implicit rate of growth in productivity actually used was only 1.875 percent.

Teeters concluded as follows:

The relationship between the assumed rates of price and wage increase is unrealistic. The rate of price increase is too high relative to the rate of wage increase. This means that the estimates of future benefits are going to continue to be overstated since the price assumption is applied to the benefits, and the revenues are going to continue to be understated since the wage assumption is applied to calculation of the tax base.

It is interesting to examine the foregoing statement in light of what actually happened in the past 15 years and what the situation now seems to be as to the financing status of the Social Security program. Certainly, it is by no means the case that the assumption about price increases was too high relative to those that have actually occurred in the past 15 years and those that are likely to occur in the future.

Furthermore, it was by no means the case that future benefit costs were overstated in the early 1970s, as evidenced by the large long-range financial imbalance that was present before the 1977 Act was enacted.

Also in this respect, it is interesting to examine some statements in the opposite direction that Teeters made in an article in the *Wall Street Journal* for July 28, 1972:

Over the long range, the costs have been made to appear low by neglecting to take into account the current trend toward immediate-ZPG and by assuming that the nation's productivity will continue to increase into the indefinite future at an annual rate of about 2 percent to 2¼ percent, as it did in the past, certainly far from a sure thing in light of the shift of public emphasis toward ecological goals rather than year-after-year production increases.

So far, this statement seems valid according to the experience that has occurred to date and that seems likely for the future, except perhaps that it did not go far enough in foreseeing financing problems due to demographic and economic matters.