ABSTRACT

AN EVALUATION OF TAX-QUALIFIED RETIREMENT PLANS
FOR SELF-EMPLOYED INDIVIDUALS

by Dempsey M. Dupree

The Self-Employed Individuals Tax Retirement Act of 1962, better known as H. R. 10, was represented in some quarters as providing significant tax benefits--others complained that the Act is so deficient as to be of little value to self-employed persons. In this study an evaluation of H. R. 10 is made in general as well as quantitative terms.

Events leading up to the 1962 Act are discussed and the principal features of traditional pension tax law are recognized as they still apply to regular employees. Pension tax benefits accorded regular employees are compared, in general terms, to the benefits provided self-employed persons by H. R. 10.

In order to obtain a quantitative measure of the effectiveness of investments in H. R. 10 plans, formulae for evaluating the performance of such investments by means of so-called capital budgeting techniques are developed. The rate of return formula is programmed for computer use, and rates of return are determined for potential H. R. 10 investments under a considerable number of combinations of circumstances. Rates of return determined for H. R. 10 investments by a self-employed person are compared to returns on investments under the same circumstances by a stockholder-employee in a corporate-employee pension plan.

Some of the trends apparent in the quantitative data are noted,

and suggestions are offered concerning the use of data, and the evaluation framework in general, in evaluating an H. R. 10 investment.

Based on the discussion and analysis in the study, the following conclusions are drawn:

1. H. R. 10 did not provide pension tax benefits to self-employed persons comparable to those accorded regular employees under traditional plans.

2. Investments in pension plans are capable of being evaluated in present value terms by means of so-called capital budgeting techniques.

3. Participation in a pension plan as a stockholder-employee will almost always provide a higher rate of return than participation under the same circumstances in an H. R. 10 plan as a self-employed person.

4. After-tax returns to investments in H. R. 10 plans, in spite of the shortcomings attributed to the Act, compare quite favorably in many cases to after-tax returns available on non-pension types of investments.

5. The after-tax rate of return to H. R. 10 investments by a self-employed person is positively related to the before-tax rate of return achieved, the amount of basic contributions made by him, and the level of his marginal tax bracket during the years prior to his retirement. It is negatively related to the amount of contributions made for his employees, and to the level of his marginal tax bracket after retirement. Under most circumstances observed, the after-tax rate of return is positively related to the length of the period of participation prior to retirement, to the number of years after retirement over which proceeds are received, and to the amount of supplemental contributions made by the self-employed person.

As a result of the discussion, analysis, and conclusions, the following recommendations are made:

1. The inequity existing between pension tax benefits provided for self-employed persons and those provided for stockholder-employees should be removed through legislation. The amendments currently under consideration in Congress would largely remove the inequities. The proposed amendments would remove the 50 per cent limit on deductibility of basic contributions by a self-employed person, remove the 10 per cent or $2,500 limit on basic contributions by self-employed persons who have

common-law employees, liberalize the present definition of "earned income" where capital investment is material, and give tax recognition to "professional corporations" permitted by State law.

2. Self-employed persons should consider the merits of investing in H. R. 10 plans, whether or not the proposed amendments to liberalize the law are enacted.

3. H. R. 10 investment opportunities, and other potential investments as well, should be quantitatively evaluated in terms of rates of return or net present values. The results of the quantitative analysis ought to be considered along with non-quantifiable factors in arriving at a decision of whether or not to invest in the alternative under consideration.

4. More complete tables showing results of simulations by computer of investment results should be compiled whenever legislative action (either pro or con) on the proposed amendments to H. R. 10 is taken. Such tables should prove most useful to persons who are considering the adoption of an H. R. 10 Plan.

5. The framework developed in this study for H. R. 10 investment analysis should be adapted to simulations and comparisons of returns to other kinds of investments.

6. Research should be undertaken in an attempt to introduce future changes in purchasing power as a variable in formulae for evaluating investments.

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TABLE OF CONTENTS

LIST OF TABLES

Giving After-Tax Rates of Return To Investors in Certain Pension Plans

LIST OF FIGURES

After-Tax Rates of Return to A Self-Employed Person and To A Stockholder-Employee Participating in Pension Plans Under Similar Circumstances (Case IIa and IIb)

LIST OF EXHIBITS

CHAPTER I

INTRODUCTION

Purpose of the Study

The Self-Employed Individuals Tax Retirement Act of 1962 was the result of many years of pressure by self-employed persons, and organizations representing them, for legislation. This pressure was applied in an effort to obtain tax benefits for self-employed individuals equivalent to those already available to employees participating in "tax-qualified" pension plans.[1] "The primary purpose of the Self-Employed Individuals Tax Retirement Act of 1962 is to give self-employed persons access to retirement plans on a basis similar to that given to employees whose employers have established pension, profit-sharing or stock bonus plans."[2]

This study is an evaluation of the effectiveness of the Self-Employed Individuals Tax Retirement Act of 1962, sometimes called the

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[1] "Qualified" plans are those covered by Section 401 of the Internal Revenue Code.

[2] "New Retirement Tax benefits for Self-Employed," Standard Federal Tax Reports, Number 45 (Extra Edition), October 31, 1962, Commerce Clearing House, Inc., p. 5. A similar purpose was recognized by the Staff of the Joint Economic Committee of Congress when it wrote that "The Self-Employed Individuals Tax Retirement Act was enacted for the primary purpose of granting the self-employed access to retirement plans on a basis reasonably similar to that accorded many corporate employees." The Federal Tax System: Facts and Problems, 1964, U. S. Government Printing Office, Washington, p. 130.

Keogh-Smathers Act[1] but most commonly referred to as H. R. 10.[2] One aspect of this inquiry is an evaluation of the extent to which the aforementioned purpose of H. R. 10 was achieved by its enactment. A general comparison of H. R. 10 provisions for self-employed persons with the Code provisions for employees should help in such an evaluation. A quantitative comparison of the results attained on investments in H. R. 10 and corporate plans under comparable circumstances will provide a measure of the effect of the differences in tax treatment.

Another aspect of this study is an evaluation of the effectiveness of the investment forms sanctioned by H. R. 10 in terms of their potential earnings performances. Contributing to a pension plan is a form of investment, usually aimed at assuring a fairly comfortable existence after retirement. Proceeds for retirement can be provided also by other investments than formal retirement plans. Any favorable tax treatment accorded an approved investment medium will certainly influence earnings performance. Tax advantages, however, may be offset by other factors that also influence returns on investments.

H. R. 10 has been represented as providing significant tax benefits to self-employed persons. The American Institute of Certified Public Accountants is one of a number of institutions that sponsor H. R. 10 plans for members. In correspondence with its membership the Institute

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[1]Representative Keogh of New York sponsored a bill in the House and Senator Smathers of Florida sponsored a similar bill in the Senate. The law enacted contains features of both bills, as well as a number of modifications of the bills as introduced.

[2]The number H. R. 10 was assigned to the bill introduced by Representative Keogh in the House. The law as enacted was P. L. 87-792 and was signed by the President on October 10, 1962. P. L. 87-792 is applicable to taxable years beginning after 1962.

said about these plans:

> One of the primary objectives of the program is to take advantage of the tax features of H. R. 10. Operating under the provisions of the law and subject to its statutory limits . . . the program will afford multiple tax savings to participants.[1]

The American Medical Association also makes retirement plans available to its members. In a prospectus dated November 22, 1963, the Association stated that "the AMA Board of Trustees in September, 1963, voted to recommend to the Association members the retirement program which is summarized herein."[2]

Commerce Clearing House, after listing the tax-deferment features of the Act went on to add that "the tax benefits made available to the self-employed individual are obvious."[3]

In spite of the tax advantages attributed to H. R. 10, some writers have suggested that the Act has serious shortcomings:

> It is extremely questionable whether H. R. 10 is much help in achieving tax relief for the self-employed.[4]

> The Act's rules and benefits with respect to both owner-employees and narrow [not over 10 per cent interest in partnership] partners represent a pallid shadow of those applicable to corporate stockholder employees.[5]

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[1] CPA, November 1962, p. 5.

[2] "Prospectus, American Medical Association Members Retirement Plan," The Journal of the American Medical Association, November 30, 1963, Vol. 186, No. 9, p. 157A.

[3] Standard Federal Tax Reports, Number 45, 1962, CCH, p. 5.

[4] William H. Hoffman, Jr., "Many Limitations of H. R. 10 Make Its Use Generally Undesirable," The Journal of Taxation, April 1963, p. 218.

[5] Marcus D. Grayck, "Tax Qualified Retirement Plans for Professional Practitioners: A Comparison of the Self-Employed Individuals Tax Retirement Act of 1962 and the Professional Association," Columbia Law Review, March 1963, p. 432.

> The Act does not bring about even approximate equality of treatment for the self-employed as compared with their corporate counterparts so far as pensions are concerned.[1]
>
> We hope that this [article] will demonstrate the merits of expanding [H. R. 10] coverage and help persuade Congress to extend its benefits in such a way as will encourage, rather than discourage its use.[2]

H. R. 10 requirements for qualification are somewhat more stringent than those for regular employee plans. The limitations most often criticized are those on annual contributions and deductions, employee coverage and vesting requirements, and the denial of capital gain treatment for proceeds of plans.[3] The effects of these factors may cancel a part or all of the value of apparent tax advantages under some circumstances. It is said that the restrictions effectively prevent most self-employed persons from participating in retirement plans under H. R. 10. One observer estimated that only 10,000 to 15,000 individuals were participating in H. R. 10 plans two years after enactment of the law.[4]

A reduction of H. R. 10 alternatives to rates of return (or to net present values) will indicate that some H. R. 10 plans are more profitable than others under certain circumstances. The earnings performance of H. R. 10 plans may be compared also to expected returns of other

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[1]Glendon E. Johnson, General Counsel of American Life Convention; as reported in "Summary of Technical Session in Chicago on H. R. 10--Self-Employed Individuals Tax Retirement Act of 1962 (Public Law 87-792)," Bulletin of the Section of Taxation, American Bar Association, October 1963, Part One, p. 43.

[2]"The Economics of H. R. 10," The Journal of Taxation, December 1962, p. 347.

[3]See the section of Chapter III starting on page 33.

[4]Pearce Shepherd, Chairman, Special Committee on Pension Plans, U. S. Chamber of Commerce, as reported in "News Report," The Journal of Accountancy, May 1965, p. 18.

investment alternatives. Earnings trends, cutoff limits, and rankings of the various alternatives may be established in terms of their relative profitability. This additional information may help self-employed persons to make more rational investment decisions. Anticipated earnings performances may be considered along with non-quantifiable personal preferences for such things as the timing of payments and returns and the degree of risks involved. It is likely that some persons presently initiating H. R. 10 plans do so without any quantitative comparison whatever--taking for granted that the tax advantages are obvious.

The results of a quantitative analysis and comparison of earnings performances of H. R. 10 plans under various circumstances should be helpful also in evaluating the overall effectiveness of the Act. They may help to explain why so few self-employed persons are choosing to participate in qualified plans. They should help to quantify to some extent the more stringent restrictions imposed on self-employed persons as compared to treatment accorded plans for ordinary employees. Conclusions may be drawn from a quantified comparison to support recommendations for improvement of the law through future legislation.

Organization of the Study

Some understanding of the setting for H. R. 10 is necessary to a proper appraisal of its effectiveness. Chapter II develops the background from which H. R. 10 became law. Events leading up to the 1962 legislation are summarized.

The principal features of H. R. 10 are summarized in Chapter III. These features are then compared to the treatment accorded employees

under law existing prior to H. R. 10. Such a comparison helps to evaluate, in a general way, the extent to which the stated purpose of H. R. 10 was accomplished. Chapter III also contains a description of some of the retirement plans that satisfy the requirements of H. R. 10.

Formulae for quantitatively evaluating H. R. 10 investment alternatives in terms of their anticipated earnings performances are developed in Chapter IV. These formulae allow the returns from H. R. 10 plans to be compared to returns that might be obtained from other investment alternatives. In Chapter V, the focal point of this study, some results of a quantitative evaluation of H. R. 10 plans are presented.

Conclusions and recommendations based on the findings of the study are presented in Chapter VI.

CHAPTER II

EVENTS LEADING TO THE 1962 ACT

Although the first industrial pension plan was established in 1875,[1] private pension plans were relatively uncommon until the advent of World War II, and their most rapid rate of growth came during the 1950s. In 1929 about 1.5 million workers were covered by some type of industrial pension or deferred profit sharing plan;[2] by 1950 there were 9.8 million workers covered; in 1962 about 23.1 million workers were covered by some kind of private plan.[3] Many reasons have been given for the tremendous increase in the use of pension plans.[4] Most of the reasons given are grounded in social objectives; even so, it is unlikely that the social pressures would have been sufficient to force employers to adopt pension plans if the Federal Government had not undertaken to encourage the plans in some way. The principal manner by which the

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[1]The American Express Co. set up the first industrial plan in 1875. The Co. paid benefits up to $500 a year to incapacitated workers over 60 with at least 20 years service, provided they were deemed worthy. "Old Age Pensions," Time, May 22, 1950, p.26.

[2]"Old Age Pension: How Big? Who Should Pay for Them? Will They Cripple Business? Can 'Security' Be Guaranteed?," Time, Vol. LV, No. 21, May 22, 1950, p. 26.

[3]Staff of Joint Economic Committee of Congress, The Federal Tax System: Facts and Problems, 1964, U. S. Government Printing Office, Washington, Table 22, p. 124.

[4]Profit-sharing plans have also been widely employed. These plans oftentimes have the same objectives as retirement plans. The principal difference is that the amount of contributions to the plans are determined by the level of company profits.

Government encourages such plans is through the tax system.

Social and Economic Pressures

Employers undoubtedly recognize some obligation to their elderly employees who have contributed to the success of the business. A formal pension plan is one means of helping employees to retire gracefully—but not the only means. Quite likely, the growth of formal pension plans resulted from the cost advantages to business that such plans had over other alternatives.

An employer might simply continue to pay deserving employees who have retired. Such a practice would be better for employee morale then no provision at all. Since their livelihood after retirement depends on the whims of the employer, employees are likely to feel somewhat insecure, however. Also, there is no assurance that the employer will continue to survive as long as the retired employee lives.

Older employees could be retained on the job and given such duties as they are capable of performing. Old and feeble employees may do more to impede efficient production, however, than contribute to it. Also, the advantages of a forced retirement program may more than offset any contributions to production that could be made by aged workers. Younger, more productive, workers may be able to occupy space and use machinery much more effectively. Younger people may be more adaptable to improved production techniques and may even help to institute more efficient production practices.

The morale of younger employees is apt to be higher if they can foresee reasonable opportunities for advancement. Retirement of older

workers generally helps to provide such opportunities. Presumably, if retired workers are supported by the firm to some degree, the retirement program itself will help morale more than hurt it. Good employee morale aids in the reduction of turnover and in the improvement of production efficiency.

Strong feelings about the social desirability of retirement plans may exist in the community in which the firm operates. Bad relations with the community can bring about retaliatory measures, particularly when the community affected also makes up a considerable portion of the firm's market. Also, the firm may find that it is being taxed and regulated in a discriminatory manner. In any event, the managers or owners of a firm prefer to live in a friendly community rather than in a hostile one.

Once some of the firms competing in the labor market adopt retirement plans other firms may have little choice in the matter. Retirement contributions will be one of the concessions necessary to get and retain good employees. A hold-out company may find that it is losing its superior employees to other firms, and that it can employ only inferior workers as replacements. In such a situation a firm can justify the adoption of a funded retirement plan on a short-run economic basis alone.

The demands on firms for retirement benefits and the resulting pressure for tax relief was a part of the social and economic trend. There were many reasons for the trend but they seem to fall into three chief categories: 1) The increasing number and proportion of old people, 2) the changing nature of the family unit and, 3) the conviction that

"society" should assume certain responsibilities for the needs of individuals.

The increasing number and proportion of old people[1] came about both as a result of extended life expectancy[2] and of a declining birth rate.[3] A longer life expectancy is primarily due to medical advancements but is also attributable to the increasing number of people who are able to take advantage of medical services because of a generally higher standard of living. This in turn is attributable to the success of our economic system in bringing about a considerable reduction of the number of people in the "poverty" class.[4]

The reduction in number of children per family combined with the increasing life span of older people to raise the proportion of elderly in the population. One of the reasons for fewer children per family was undoubtedly the urbanization trend, the resulting increased costs of caring for children, and the diminished economic advantage of children as laborers.

The foregoing observations lead into the changing nature of the family unit itself. Probably the greatest factor influencing the family

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[1]Between 1930 and 1960 the number of people over 65 in the United States went from 6.6 million to 16.6 million. The people over 65 made up about 5.4% of the population in 1930 and about 9.3% of the population in 1960. Derived from Table No. 17, Statistical Abstract of the United States (1964), p. 22.

[2]In 1920 the life expectancy at birth was 54.1 years; in 1962 life expectancy at birth was 70.0 years. Statistical Abstract of the United States (1964), p. 54.

[3]The birth rate declined from 30.1 per 1,000 population in 1910 to 22.4 per 1,000 in 1962. Statistical Abstract of the U. S. (1964), p.48.

[4]Disposable personal income per capita (in 1963 prices) increased from $1,254 in 1929 to $2,126 in 1963. Statistical Abstract of the United States (1964), p. 328.

unit has been the urbanization of the population.[1] Closely allied with the urbanization trend has been the decrease in proportion of farmers and farm laborers.[2] A family in the city is less of an economic unit in that it is less self-sufficient and more dependent on the employer of each wage-earner. The old and young have less opportunity to contribute to the support of the family; instead they must be supported by those who are employed.

Living units in urban areas tend to be smaller due to space and cost limitations. As a result there is an incentive to keep the family size small.[3] Children and old people become burdens and crowd living areas. The family unit narrows to the man, his wife and their minor children. Parents and grown children are members of separate family units. Such a change in family identity shades out the responsibility of children for the welfare of elderly parents. It also tends to reduce the demands by parents on their children for support.

The aforementioned developments have been accompanied by a general increase in the recognition by "society" of a responsibility to individuals. This trend is evidenced by the growth in Government "welfare" programs and by the current emphasis on elimination of poverty and unemployment. People are often viewed as instruments of society—conditioned by their sociological environment. Those who find themselves in unfortunate circumstances

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[1]In 1910, 45.7% of the population lived in urban areas while 69.9% of the population was urban in 1960. Statistical Abstract of the United States (1964), p. 17.

[2]The proportion of agricultural workers decreased by 65% from 18.5 % to 6.4% of all employed persons just between 1940 and 1960. Max Rutzick and Sol Swerdloff, "The Occupational Structure of U.S. Employment, 1940-1960," Monthly Labor Review, (November, 1962), p. 1211.

[3]Population per household declined from 4.93 in 1890 to 3.38 in 1960. Statistical Abstract of the United States (1964), p. 35.

sometimes are unable to rise from the level to which "society" has forced them. Many people today (including some of the very wealthy) think that those who have been "favored with success" share an obligation for the well-being of those less fortunate.

Some of the obvious social and economic pressures that have set the stage for demands for pension plans have been mentioned. The problem has been one of how to take care of an increasing number and proportion of old people.

Tax Rate Effects

To some extent the existence of high progressive tax rates themselves create pressures for treating contributions to pension funds favorably. The higher the tax rates, the less income after tax is left from which to accumulate for retirement years. "A major stimulus for the growth of deferred compensation arrangements has been the heavy burden of individual income taxes."[1]

Payments to retired employees have always been treated as a deductible business expense, except in cases where such payments were outright gifts. Contributions to funded plans were given formal recognition as business expenses in the Revenue Act of 1928.[2]

The introduction of an income tax decreases the value of firm revenues and lightens the burden of expenses. In other words, income after taxes will not increase by the full amount of any additional

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[1]Staff of Joint Economic Committee of Congress, The Federal Tax System: Facts and Problems, 1964, U. S. Government Printing Office, Washington, p. 129.

[2]Roy and Gladys Blakey, The Federal Income Tax (N.Y., 1940), P.299.

revenue; after-tax income will not decrease by the full amount of added expense. Government participates with the firm in revenues and shares the burden of expenses. Naturally, the higher the marginal income tax rate, the greater is the effect on incremental revenues and expenses.

Income tax rates were not overly burdensome prior to World War II.[1] During World War II, however, the top marginal rate was increased to 94 per cent on taxable income over $200,000 for individuals[2] and to 40 per cent on taxable income over $50,000 for corporations.[3] In addition, a tax on "excess profits" of 95 per cent applied to corporations, although the total tax on corporations was limited to 80 per cent of income.[4] Businessmen often spoke of twenty-cent dollars during that period.

Business firms found that the net after-tax costs of higher employee wages were relatively small. Pressure for higher wages were great due to the shortage of labor and the level of product demand. On the other hand wage rates were held down by Government controls. Fringe benefits, however, were not included in the wages that were

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[1]For instance, Section 11 of the 1939 Code levied a normal tax of 4% on taxable income. Section 12 levied progressive surtax rates on surtax net income. For example, the marginal surtax rate on $4,000 - $6,000 was 4%; $20,000 - $22,000, 15%; $50,000 - $56,000, 31%; $100,000 - $150,000, 58%; in excess of $5,000,000, 75%. A tax of 19% was levied on corporate taxable income by Section 13 of the 1939 Code.

[2]Sections 3 and 4(a) of Income Tax Act of 1944 amending Sections 11 and 12 of the 1939 Code.

[3]Sections 105(a) and 105(b) of the 1942 Act amending Sections 13 and 15 of the 1939 Code.

[4]Sections 202(a) and 202(b) of 1943 Act amending Section 201 of the 2nd 1940 Act which added Section 701 to the 1939 Code.

controlled.[1] Firms were relatively free to compete for (or to retain) good employees by offering them attractive fringe benefits. This was the setting in which the pension plan device took root and began to grow.

Labor Union Pressures

Once pension plans became a part of the compensation scheme in some firms the trend was not to be stopped. The big push by unions for pensions really came after the National Labor Relations Board ruled in the Inland Steel Co. case in 1948 that a company must bargain about pensions with a union or be in violation of the Taft-Hartley Act.[2] The Board's ruling was upheld by the Seventh Circuit Court of Appeals.[3] As labor law stands today, employers have no choice but to bargain with unions about pensions.

Much was said and written as a result of the Inland Steel Co. decision. Some people contended that management's prerogatives had been taken away. Others felt that pensions were a government responsibility, and some made dire predictions about the outcome of burdening business with pension costs.

The United Mine Workers, led by John L. Lewis, underwent a long and bitter strike in 1948 over the pension issue. That strike was ended only by a restraining order from the Federal Courts.[4] The Union

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[1]"Pension Warning; Employers Can't Drop Plans Unless Business Necessity Requirement Is Met," Business Week, October 13, 1945, p. 104.

[2]Inland Steel Co. Decision of NLRB, 77 NLRB 1 (1948).

[3]Inland Steel Co. v. NLRB, 170 F 2d 247 (CA-7, 1948). U.S. Supreme Court cert. denied, 336 US 960 (1949).

[4]U. S. v. U.M.W. 77F. Supp. 563 (D6, D of C, 1948).

eventually won pensions of $100 per month for workers who were to retire at age 62 or older. The pensions were to be financed by an employer contribution of 10 cents per ton of coal mined; contributions to be paid into a union pension fund.[1]

In 1949 a fact-finding board appointed by President Truman recommended noncontributory, company-financed pensions for the entire steel industry as a compromise to end the industry's labor troubles. The chairman of the fact-finding board later conceded that he thought a government program covering all workers would be safer and less expensive.[2]

Social Security

The Federal Government had not been altogether neglectful in the area of old age assistance. Congress provided for several kinds of assistance in the Social Security Act of 1935.[3] The 1935 Act instituted the Federal "insurance" program supported by contributions from both employees and employers (FICA). It also initiated old age assistance benefits for those not covered by the "insured" program, and for their dependents and survivors. The Act provided for aid to dependent children and for other needy groups as well. The old age assistance and other social programs were to be jointly supported from Federal and State funds. In addition, the 1935 Act introduced unemployment benefits

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[1]"Rising Demand for Pension Plans," U.S. News and World Report, April 23, 1948, p. 44.

[2]Business Week, "What Do Fact Finders Find?" April 1, 1950, p. 90.

[3]Roy G. and Gladys C. Blakey, The Federal Income Tax (New York, 1940), pp. 383-400.

to be financed largely by employer contributions. Most of the social programs started by the 1935 Act are still in existance, although they have been amended and expanded beyond the Act's original coverage.

The Federal "insurance" program was not (and is not) an insured program in the full sense of the word. A reserve has been created, but only to assure the liquidity of the program during years when receipts may not equal payments required--the program is not "fully-funded." The initial rate of tax of 1 per cent of base wages on both employers and employees in 1935 rose gradually to a rate of 3 5/8 per cent in 1963 in order to take care of increasing numbers of participants and broadened coverage. The rate is scheduled to increase further to 3.85 per cent in 1966, 3.90 per cent in 1967, 4.40 per cent in 1969, and to 4.85 per cent for years after 1972.[1] The tax rate on base earnings of self-employed persons is presently 5.4 per cent, and is scheduled to go to 5.8 per cent in 1966, to 5.9 per cent in 1967, to 6.6 per cent in 1969, and to 7 per cent for years after 1972.[2] Currently, base earnings are earnings from employment or self-employment up to $4,800 each year. The earnings base is due to be increased to $6,600 on January 1, 1966.

The so-called "medicare" bill of 1965 added a "hospital insurance" contribution rate, to start in 1966, to the regular social security taxes. The hospital insurance taxes start at 0.35 per cent of base wages in 1966, and are scheduled to rise to 0.80 per cent for years after 1986. These taxes are to finance medical care benefits for persons over age 65.[3]

Among the recommendations that were not incorporated into the 1935 Act was one to have the Federal Government undertake to sell to individuals deferred life annuities similar to those available through

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[1]Code Sections 1301 and 1311. [2]Code Section 1401.

[3]U. S. Dept. of Health, Education and Welfare, Social Security Amendments, 1965, U. S. Government Printing Office, Washington.

life insurance companies.[1] Although Government annuities have never been part of the Social Security program, it is interesting to note that H. R. 10 provided for a special class of Government bonds that qualify as investments for H. R. 10 plans.[2]

Tax Treatment of Pension Plans for Employees[3]

Prior to 1963, employees (as that term is legally defined) were the only participants in approved pension plans. A self-employed owner of a business could not participate in a qualified pension plan along with his employees unless his business was recognized as a corporation for tax purposes. He could then participate as an "employee" of the corporation. The usual procedure for doing this was to incorporate the business in accordance with the corporation laws of one of the States.

Another approach sometimes used was to gain recognition of the business as an "association", as allowed for in the definition of a corporation in Section 7701(a)(3) of the Internal Revenue Code. If the business qualified as an association, it could be taxed as though it were a corporation without actually incorporating in any State.

The Self-Employed Individuals Tax Retirement Act of 1962 did not make any changes of consequence in the treatment accorded employee plans. Generally speaking, employees participating in plans that include self-

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[1]Blakey, The Federal Income Tax, p. 385.

[2]Code Section 405.

[3]Some of the material in the next two subdivisions of the Chapter, and part of the first two subdivisions of Chapter III, was included in similar form in my article, "Tax Qualified Retirement Plans for Self-Employed," University of South Carolina Business and Economic Review, February, 1965.

employed persons are more favorably treated than are those in ordinary employee plans.[1] Basically, then, tax treatment of employee pension plans is unchanged from that accorded by the law before it was amended by the 1962 Act.

Code Sections 401 through 404 are the principal sections of the law pertaining to qualified pension plans for employees. H. R. 10 amended these sections (and other related sections) and added Section 405 to the Code. Section 405 provides for pension fund investment in the new, special class of government bonds created by the Act. No attempt will be made here to cover every aspect of pension plan tax law either as it applies to employees or to self-employed persons. Instead, the more important requirements that are generally applicable to employee plans are summarized in this portion of the study. A similar recognition of the main provisions of H. R. 10 follows in CHAPTER III.

The tax advantages to participants that are usually attributed to qualified employee pension plans generally stem from three related features. One is that contributions made by the employer are not taxed currently to employees.[2] This feature holds even though employees and employers are likely to view such contributions as a form of current earnings by employees. The deferral of income tax permits a greater base on which income may be derived during the remaining years until retirement.

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[1]See Chapter III, p. 33 of this study for a comparison of the employee privileges under H. R. 10 to those under regular employee plans.

[2]Code Section 402.

The second main feature is that returns to plan investments are not taxed as they accumulate.[1] This feature allows the plan to grow much faster since the amounts that would have been paid as income tax if other forms of investment were used earn returns in the remaining years of the plan's existence.

The third feature is that qualified pension plans act as a sort of leveling device, shifting income from high tax-bracket years of early life to low tax-bracket years after retirement. Additional exemptions for age,[2] retirement income credits,[3] and absence of earnings from employment all help to assure lower tax-brackets after retirement.

The aforementioned features are all favorable to employees. Employers may deduct contributions to qualified pension plans for their employees as they are made,[4] subject to limits that will be mentioned presently. Certain advantages for the employer may stem indirectly from those of the employee. For instance, the employer may get by with a smaller contribution to a qualified plan than would be required if the compensation were currently taxable to the employee. Or some of the pension plan funds may be available to the employer through a sale of its securities (perhaps indirectly) to the pension fund.[5] Other advantages to the employer may result from careful planning of the pension plan agreement. For example, the plan may provide that employees who leave the employer before their retirement must forfeit some or all of their interest in the plan that is attributable to employer contributions.

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[1]Code Section 501(a). [2]Code Section 151(c).

[3]Code Section 37. [4]Code Section 404(a).

[5]"How 1958 Laws Changed Taxes," Business Week, September 20, 1958, p. 104.

Such a provision tends to tie the employees more closely to the employer and provide him with a more stable labor force. Forfeited rights of employees who leave may also help to hold down the employer's cost of supporting the plan in later years. Yet such forfeiture provisions may be permitted as long as they are not discriminatory and as long as there can be no reversion back to the firm of any of the firm's contributions.[1]

A qualified employee pension plan must not discriminate in coverage of shareholders, officers, or supervisory employees. The plan is generally acceptable as long as 70 per cent or more of all employees are eligible to benefit under the plan, and 80 per cent of those eligible do benefit from the plan. Employees who have not been employed by the employer for at least 5 years need not be considered in determining whether the foregoing tests are met. A plan may be approved by Internal Revenue as non-discriminatory, however, even though it does not meet the percentage test.[2]

Another important requirement is that the plan must not call for discriminatory contributions or benefits in favor of shareholders, officers or supervisory employees.[3] Contributions in the amount of a fixed percentage of earnings are not considered discriminatory, even though some employees are earning much more than others.[4]

Deductible contributions by an employer to pension trusts are limited to 5 per cent of total compensation to all employees under the

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[1]Code Section 401(a)(2), Regulation 1.401-2.

[2]Code Section 401(a)(3). [3]Code Section 401(a)(4).

[4]Code Section 401(a)(5).

plan during the year plus an element for funding obligations related to past services.[1] A plan that calls for contributions determined by the level of profits of the firm may permit deductions by the employer up to 15 per cent of the compensation of the members of the "profit-sharing" trust.[2] An employer may in fact provide both a pension plan and a profit-sharing plan for his employees.[3] Pension, profit-sharing, and stock bonus plans are similarly treated in the law.

"Kintner" Regulations

Of all the self-employed individuals, professional persons, such as public accountants, lawyers, and physicians have found it most difficult to share in tax benefits of retirement plans. Traditionally, it has been considered unethical for a professional person to place a corporate entity between himself and his client or patient.[4] This is because of the highly personal relationship between the professional man and his client, and the importance of holding the professional person fully liable for his actions and judgments.[5] As a rule, the

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[1]Code Section 404(a)(1).

[2]Code Section 404(a)(3).

[3]Code Section 401(a)(7).

[4]See Section II (Corporate Practice of the Professions), pp. 750 - 53, of "Qualified Pension Plans for Unincorporated Professional Associations," Stanford Law Review, Vol 12, July, 1960, for a good statement of the arguments, and legal precedents, against incorporation by professional persons.

[5]Ibid.

client must accept the professional person's judgment without question since he is not qualified to evaluate it. Professional associations have generally discouraged the use of the corporate form of business by their members.[1] State laws add legal strength to the ethical responsibilities of professional persons.[2]

A special hybrid form of business was recognized by the addition of Subchapter S to Chapter 1 of the Internal Revenue Code in 1958. Owners of a business concern that has the characteristics of a "Small Business Corporation," as defined in the Code, may operate their firm as a corporation yet elect to report their shares of business net income in their personal tax returns as though they were partners.[3] Generally speaking, stockholder-employees of "Subchapter S" corporations may enjoy the fringe benefits available to ordinary employees--including participation in tax-qualified retirement plans. As already pointed out, however, professional persons may be ethically and/or legally prohibited from practicing as a corporation. Although the addition of Subchapter S to the Code gave some self-employed persons another way to incorporate,[4] it did

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[1]Consider, for example, Article 4.06 of the Code of Professional Ethics, American Institute of Certified Public Accountants, that reads: "A member or associate shall not be an officer, director, stockholder, representative, or agent of any corporation engaged in the practice of public accounting in any state or territory of the United States or the District of Columbia."

[2]For example, all States have enacted laws governing the practice of public accounting. As one illustration, see the "South Carolina C.P.A. Law," Section 56, Code of Laws of South Carolina.

[3]See Code Sections 1371-1377.

[4]This is not to suggest that making fringe benefits available to self-employed persons was the only reason (nor the main reason) for enactment of Subchapter S.

not eliminate the discriminatory treatment of those who could not (or who chose not to) incorporate.

The Internal Revenue Code defines a corporation by simply stating that, "the term 'corporation' includes associations, joint-stock companies, and insurance companies."[1] Treasury Department Regulations[2] have set forth the conditions under which an unincorporated business might qualify as an "association" and may file (or be required to file) as though it were a legal corporation. Generally speaking, when a business concern appears to have most of the characteristics of a corporation in substance, it may be treated as a corporation for tax purposes, even though it has not been legally formed as one.

In 1954, the Ninth Circuit Court of Appeals held in the Kintner case that a group of physicians, operating a clinic, constituted an "association" and therefore could participate in a pension plan as though they were actually incorporated.[3] The Commissioner did not immediately acquiesce to the Kintner decision, but after a similar decision in the Galt case in 1959,[4] he issued the so-called "Kintner" regulations.[5] These regulations supplemented the mention of associations in Code Section 7701(a)(3) by, among other things, outlining four tests to be used in establishing the existence of an association for tax purposes. These tests were under headings as follows: 1) continuity of life, 2) centralization of management, 3) limited liability, and 4) free transferability

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[1]Code Section 7701(a)(3).

[2]Primarily Regulation 301.7701-2.

[3]Kintner, 216 F. 2d. 418. [4]Galt, 175 F. Supp. 360, (D.C. Tex.).

[5]Treasury Decision 6503, Cumulative Bulletin 1960-2, pp. 409-22.

of interests.[1] The "Kintner" regulations also stated that local law would play a strong part in determining whether or not an association was in existence.[2] One of the examples originally used in Regulation 301.7701-2 was of a group of physicians whose clinic organization was acceptable as an association for tax purposes.

Professional Corporations

Subsequent to the initial "Kintner" regulations the States began adopting laws permitting a form of professional incorporation in the belief that Internal Revenue would surely accord a professional group corporate status if it were issued a corporation charter by the State. To date thirty-five States have given formal legal credence to certain kinds of professional associations.[3]

In many cases the new State laws establish a corporation in name only. Limited liability is seldom extended to owners of professional corporations. Also the usual corporate features of free transferability of ownership, centralization of management, and continuity of life are likely to be missing in professional corporations. The trend of legislation has been likened to that prior to 1948, when States were passing community property laws in order to overcome the inequity in the tax law

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[1]Regulation 301.7701-2. [2]Regulation 301.7701-1(c).

[3]Professional associations are authorized in Alabama, Connecticut, Georgia, Illinois, Pennsylvania, South Carolina, Tennessee, Texas and Virginia. Professional corporations are authorized in Arizona, Arkansas, Colorado, Florida, Idaho, Indiana, Kansas, Kentucky, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, North Dakota, Ohio, Oklahoma, Rhode Island, South Dakota, Utah, Vermont, West Virginia, and Wisconsin. The state laws are anything but uniform, however. Some states permit incorporation only by members of one profession, some more than one, and some specifically exclude incorporation by members of one or more professions. Federal Taxes, Prentice Hall, Paragraph 3216.

between community and non-community property States. That situation ended in the allowance of income-splitting by all married couples, and in the repeal of some hardly used community property laws.

"Kintner" Amendments

It appears now that all the energy expended in obtaining professional corporation laws may have accomplished very little. On February 2, 1965, amendments to Regulations 301.7701-1 and 301.7701-2 that narrow the interpretation of an association taxable as a corporation were finalized.[1] These amendments specifically mention professional groups and indicate that local law will not help these groups attain corporate status simply by labeling them as such. They eliminated from Regulation 301.7701-2 the example of a medical clinic that was suggested as being acceptable as an association. At one point in the amendments to Regulation 301.7701-1 we are told that "a professional service organization . . . would not be classified for purposes of taxation as a 'corporation' merely because the organization was so labeled under local law." The amendments all but revoke the Commissioner's former acquiescence to the Kintner case. There is now little hope that the professional corporation or association will be recognized as a corporation by Internal Revenue Service unless the Service can be forced to do so either through litigation or Congressional action.[2]

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[1]Treasury Decision 6797, Filed February 2, 1965.

[2]The Senate Subcommittee on Employment and Retirement Incomes has recommended legislation affirming that professional associations are "corporations" for tax purposes. Paragraph 60,360, Federal Taxes Report Bulletin, June 24, 1965, Prentice - Hall, Inc.

The Basic Problem

Self-employed persons were denied the right to participate in tax-qualified plans prior to the enactment of H. R. 10. The result was inequitable treatment of self-employed persons as compared to employees and especially stockholder-employees. Both classes of persons were earning incomes by means of their current efforts, as contrasted to "unearned" incomes from investment. The pressure for legislation stemmed from this basic inequity.

There were in fact two approaches available for overcoming the inequity. One was to discontinue the favorable tax treatment that had been granted to employees. The other was to grant privileges to self-employed persons similar to those already provided employees. The Treasury was reported during 1952 to be in favor of taxation of fringe benefits, including contributions by employers to pension plans.[1] Enactment of the Treasury proposal would have removed the pension inequity between employees and self-employed persons; however, it was abandoned as politically unfeasible. Some of the factors contributing to the rapid increase in the number of pension plans for employees have already been mentioned. The second approach was more in accord with the trend of the times. A means of encouraging self-employed individuals to set aside income for their retirement years had considerable social appeal.

Granting tax concessions for retirement contributions by self-employed persons was not without precedent in other countries. England

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[1] "We've Been Asked about Tax on Fringe Income", U. S. News and World Report, May 9, 1952, p. 82.

adopted such legislation in 1956[1] and Canada in 1957.[2]

Bills similar to H. R. 10 were introduced regularly in Congress between 1951 and 1962, when H. R. 10 became law. As far back as 1952 the legislative climate seemed to favor early extension of tax relief to pension plans for self-employed persons.[3] Yet, ten years passed before a law was enacted, and even then the result was a disappointment to most self-employed individuals.

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[1]Hoskin, "United Kingdom's Experience with Pensions for Self-Employed," Trusts and Estates, Vol, 97 (1958), p. 313.

[2]Fairbanks, "Taxation--Pension Plans for Self-Employed Persons," Canadian Business Review, Vol. 35 (1957), p. 564.

[3]"Changes in Taxes Ahead," U. S. News & World Report, November 7, 1952, p. 80. See also, "Are More Tax Cuts Coming?" U. S. News & World Report, December 31, 1954, p. 78.

CHAPTER III

THE SELF-EMPLOYED INDIVIDUALS TAX RETIREMENT ACT (H. R. 10)

H. R. 10 was signed into law by the President on October 10, 1962, to apply to taxable years beginning after 1962. As will be seen in subsequent sections of this Chapter, the law did not provide for self-employed persons the full pension tax benefits that have been available to employees. Some tax benefits were provided, however, which under some circumstances may more than outweigh the sacrifices also required under the Act.

Provisions of the Law

Only the more important provisions of H. R. 10 will be stated here in a general, summarized way. Any additional detail would only complicate the problem of making a general evaluation of the Act.

H. R. 10 distinquishes between a self-employed "employee" and a self-employed "owner-employee". The definition of an owner-employee, as stated in the law, reduces basically to any self-employed individual who owns more than a 10 per cent interest in the capital or profits of the business entity involved. A self-employed employee, then, is a self-employed person with 10 per cent or less interest in both capital and profits of a business concern.[1] The limitations imposed by H. R. 10

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[1]Code Section 401(c).

on participation in qualified pension plans by owner-employees are somewhat more severe in several instances than are those for self-employed employees. In some respects, the privileges enjoyed by ordinary employees were simply extended to self-employed employees.

H. R. 10 stipulates that an owner-employee may contribute up to 10 per cent of his earned income (not to exceed $2,500) to a retirement plan for himself, and deduct one-half of the contribution in determining his adjusted gross income.[1] A self-employed person who is not an owner-employee, as this designation is defined in the Code, is not limited to the $2,500 maximum contribution, but his tax deduction is still limited to $1,250.[2]

When an H. R. 10 plan contains at least one participating employee, it may be "contributory" and permit participants to make additional contributions in their own behalf. An owner-employee, as a participant, may also contribute additional amounts for himself under a contributory plan. This constitutes an exception to the maximum contributions otherwise allowed for an owner-employee. The additional contributions by an owner-employee under a contributory plan may not exceed 10 per cent of his income or $2,500, whichever is the lesser. These maximums hold regardless of the basic contribution rate. The maximum amount that is tax deductible by an owner-employee is still one-half of his basic contributions in his own behalf, but not to exceed $1,250 in any one year.

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[1]Code Sections 404(a)(10) and 404(e).

[2]Code Section 401(e)(1).

There are two additional exceptions to the 10 per cent of earnings limitations imposed on an owner-employee's contribution in his own behalf. One is that contributions for the purchase of United States Retirement Plan Bonds must be rounded to the nearest multiple of $50.[1] The other exception allows an owner-employee to continue to pay level premiums to insurance companies for life annuity, insurance, or endowment policies despite a decrease in his earned income.[2] The level premium exception applies provided the premiums do not exceed the average of the results obtained by taking 10% of his average earned income for each of the three years preceding issuance of the policy. The result for each of the years to be averaged is limited to $2,500. In any case, however, the tax deduction cannot exceed one-half of 10 per cent of the owner-employee's earned income for the year.

In order for an owner-employee to obtain the benefits of H. R. 10, all of his full-time employees with more than three years' service must be included in the plan.[3] These employees must participate on an equal basis (same percentage of their earnings contributed) with the self-employed individual, and contributions made in their behalf must vest in them immediately.[4] This means that an employee whose employment is terminated for any reason will not be required to forfeit any of his interest in the plan. Contributions made on behalf of employees are, of course, deductible as business expenses.

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[1]Regulation 1.405-1(d)(1). [2]Code Section 401(e)(3).

[3]Code Section 401(d)(3). [4]Code Section 401(d)(2)(A).

If an owner-employee is covered under any H. R. 10 plan, then the employees of all unincorporated businesses controlled by him must be covered under plans providing comparable (nondiscriminatory) benefits. Control is defined for this purpose as more than 50 per cent interest in capital or profits of the business.[1]

The law specifies that only earned income qualifies in determining the amount of contributions to be made by either owner-employees or self-employed employees. The Commissioner's Regulations provide that 30 per cent of business profits shall be treated as earned when capital investment in the business is a material income-producing factor.[2] Where 30 per cent of profits amounts to less than $2,500, the lesser of $2,500 or the amount of profit will be viewed as earned.

Plans authorized by H. R. 10 may be integrated with Social Security coverage by making contributions sufficient to assure that the total of the employer's cost of social secutity tax for an employee and retirement contributions for each employee is the prescribed per cent of the employee's earnings. In such plans an owner-employee must also reduce contributions in his own behalf by the amount of the self-employment tax on his earnings. Contributions for owner-employees may not be more than one-third of the total contributions for all participants in an integrated plan.[3]

Self-employed pension plan funds may be deposited with trusts

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[1]Code Section 401(d)(9). [2]Regulation 1.401-10(c)(3)(ii).

[3]Code Section 401(d)(6).

or bank custodial accounts, placed in life insurance contracts, mutual investment funds, or in a special class of United States bonds. Pension plan earnings are not subject to tax during the period of accumulation.

Except in cases of death or disability, benefit payments to owner-employees may not commence before age 59½,[1] and must commence by age 70½.[2] In case of premature distributions of less than $2,500 tax is due at 110 per cent of the increase in tax resulting from inclusion of the entire amount of the premature distribution in the current return. If a premature distribution is $2,500 or more the tax imposed is 110% of the increase in tax that would have resulted if the income had been received ratably over the previous four years and the year of distribution.[3] In addition, the individual involved is precluded from participating in a qualified retirement plan as an owner-employee for five years following the year in which the premature distribution is made.[4]

H. R. 10 specifically rules out capital gain treatment of proceeds attributable to contributions by any self-employed person on his own behalf.[5] When proceeds are received by a self-employed participant all in one year, however, a special averaging device is provided. The tax on the proceeds may not exceed five times the increase in tax resulting from the inclusion of 20 per cent of the taxable proceeds in the year's return.[6] Gains resulting from the new special class of Government bonds that may be purchased for retirement plans are always ordinary income—

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[1]Code Section 401(d)(4)(B). [2]Code Section 401(a)(9).

[3]Code Section 72(m)(5). [4]Code Section 401(d)(5)(C).

[5]Code Section 402(a)(2). [6]Code Section 72(n)(2).

even to regular employees participating in such plans.[1]

Comparison to Treatment Accorded Employee Plans

Corporate officers may participate in pension plans as employees, even when they are also stockholders of the corporation. The most evident discrimination has been against owners of unincorporated business concerns, as compared to stockholder-employees. Since it was this inequity that was most obvious, H. R. 10 plans will be compared to corporate plans to point out the differences in treatment still remaining. It must be kept in mind, of course, that plans in which only employees participate are treated similarly, regardless of whether or not the employer is a corporation. It is only when self-employed persons participate that H. R. 10 provisions come into play.

H. R. 10 contains a number of weaknesses when compared to benefits of traditional corporate plans or, in some cases, to no plan at all. One deficiency is the limitation on contributions and deductions by self-employed individuals. Since an owner-employee may contribute up to 10 per cent of his earned income, and since contributions on his own behalf are only 50 per cent deductible (the deduction not to exceed $1,250 in any one year), deductions of his own contributions are effectively limited to 5 per cent of his earnings up to $25,000.

In corporate pension plans the limit is also 5 per cent of compensation paid or accrued, but there is no maximum set on the dollar amount deductible. Also, the 5 per cent limitation may be exceeded by

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[1]Code Section 405 (e).

amounts necessary to fund the obligation for past services up to a total of 10 per cent of the amount required to fund the obligation completely. H. R. 10 contains no provision for funding past-service credits. Corporate "profit-sharing" plans may provide for contributions up to 15 per cent of compensation, and this may be in addition to the contributions to a pension plan. A self-employed person may establish and participate in a "profit-sharing" type of retirement plan, but the annual limitation on contributions and deductions for himself is still effective.

A successful, self-employed individual would be expected to limit the contribution percentage called for in his plan to that which will yield approximately the maximum deduction of $1,250 for himself. A professional man earning $50,000 per year would be encouraged to limit the contribution percentage to 5 per cent for all participants in the plan, rather than contribute the maximum 10 per cent permitted. If there were no maximum applicable to his own deduction, he would be encouraged to contribute the maximum of 10 per cent for his employees in order to obtain the maximum deduction for himself.

The reasoning behind the limit of deductions to 50 per cent of contributions by the self-employed person on his own behalf has been attributed to Senator Long of Louisiana.[1] He felt that the self-employed person should only be allowed to deduct the portion corresponding to an assumed employer's contribution. The fallacy here is that the self-employed person must contribute the same basic rate for his employees that he contributes for himself. If the plan is contributory, and allows employees to make additional contributions, then an owner-employee may

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[1]L. M. Rapp, "The Self-Employed Individuals Tax Retirement Act of 1962," Tax Law Review, March 1963, p. 375.

contribute as much as $5,000 on his own behalf. His deduction is still limited to $1,250, however, and this is only one-fourth of the total contribution. Since returns to qualified pension investments accumulate tax-free until after retirement, there may be a tax advantage in making contributions even when they are not currently deductible.

A self-employed person's retirement plan must include all of his full-time employees with three or more years' service, and contributions in their behalf must vest in them immediately. A corporate employee plan need not include all classes of employees (as long as it meets non-discriminatory tests for those it does cover); it may exclude all employees who have not been employed for a stated number of years. It may even be written to include only salaried employees.[1] Contributions to a corporate plan on behalf of employees need not vest immediately, as long as forfeitures cannot revert back to the employer or be used to increase benefits other employees would otherwise receive.[2] However, the fact that forfeitures may be used to defray current and future contribution obligations of the employer makes them almost as valuable as an actual reversion.

When an owner-employee participates in any H. R. 10 plan, he must provide plans with comparable benefits for all employees (with over 3 years' service) of other unincorporated businesses that he controls.[3] If the same individual were participating in a corporate plan as a stockholder-employee, he would not be required to provide plans for employees

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[1]Code Section 401(a)(5). [2]Code Section 401(a)(8).

[3]Code Section 401(d)(9).

of other businesses that he controls.

Lump-sum distributions from corporate plans at retirement may qualify for capital gain treatment as long as total distribution of benefits takes place within one taxable year.[1] H. R. 10 denies capital gain treatment for proceeds received by self-employed participants in retirement plans.[2] A self-employed person who invests in an H. R. 10 plan may convert potential capital gains (from an alternative investment) into ordinary income (from an H. R. 10 plan)—just the reverse of the usual tax tactic. This conversion is of course limited to the earnings and capital appreciation of the plan, since the contributions to the plan would have been fully taxed as ordinary earnings if they had not been contributed to a qualified retirement plan. The fact still remains that an employee participant in a plan can convert even this otherwise ordinary income into capital gain by receiving his plan proceeds all in one taxable year.

Upon the death of a participant in a corporate retirement plan, the proportion of the proceeds attributable to the employer's contributions are excluded from his estate under Code Section 2039. H. R. 10 specifically denies such an exclusion from the estate of a self-employed participant in a retirement plan. Also denied by H. R. 10 is treatment of proceeds from self-employed retirement plans as a part of the $5,000 death benefit allowed by Section 101(b) of the code. In both of these limitations, no contributions made by the self-employed person on his own behalf are viewed as being made by an "employer."

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[1]Code Section 402(a)(2). [2]Ibid.

H. R. 10 provided that contributions on behalf of self-employed persons are to be based on "earned income."[1] The Commissioner has prescribed in his regulations that "earned income" is arbitrarily assumed at 30 per cent of profit where invested capital is a material income-producing factor in the business.[2] When 30 per cent of profit amounts to less than $2,500, "earned income" will be presumed to be $2,500 or the entire amount of profit, whichever is the lesser. A stockholder-employee under a corporate plan will almost always be better off taxwise than he would be under a self-employed plan when his investment is substantial. For example, assume that an individual has $100,000 invested in a business that returns $30,000 (after pension contributions) for the current year. If a stockholder-employee has his corporation pay him $30,000 salary, the corporation may deduct $1,500 as pension contributions in his behalf at a contribution rate of 5 per cent. Under a self-employed plan with the same contribution rate, he could deduct only one-half of 5 per cent of 30 per cent of net profit, or $225. As shown in EXHIBIT 1, a business must return $83,333 before the full deduction of $1,250 may be taken under H. R. 10 when capital investment is substantial.

The law does not specifically rule out early distributions from a corporate retirement plan as long as discriminatory treatment of participants is not involved. Once contributions are made by a self-employed person, however, they are unavailable until age 59½, disability, or death, unless serious penalties are accepted. Premature distributions

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[1]Code Section 401(c)(2). [2]Regulation 1.401-10(c)(3)(ii).

will be taxed at 110 per cent of the tax resulting from including the premature distributions in the current year's income. Also, the self-employed person will be precluded from participating in a retirement plan on his own behalf for five years following the premature distribution. The lack of access to funds invested in H. R. 10 plans, in the event of some unforeseen need, may be a serious disadvantage to the self-employed individual.

EXHIBIT 1

SELF-EMPLOYED BUSINESS MAN WITH SUBSTANTIAL CAPITAL INVESTED

If Net Profits Are	"Earned Income" Will Be	Pension Contribution At 10%	Deduction Allowed
$ 2,000	2,000	200	100
6,000	2,500	250	125
16,666	5,000	500	250
33,333	10,000	1,000	500
50,000	15,000	1,500	750
66,666	20,000	2,000	1,000
83,333	25,000	2,500	1,250
500,000	150,000	2,500	1,250

H. R. 10 is deficient in many ways insofar as the accomplishment of its stated objective is concerned.[1] In spite of the rather serious shortcomings, however, there are definite advantages over no plan at all when circumstances are right. For instance, a self-employed person with no employees need not be concerned about the employee contributions, unless he expects to become an employer in the future. If there are employees, but contributions for them would be nominal in relation to those for the self-employed, they need not be a serious detriment. Also, one might expect that the presence of a pension plan would mean lower

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[1]See page 1 of this study for a statement of the purpose of the Act.

wages in the long run, in spite of the provision in the Regulations preventing cuts in employee wages at the time the plan goes into effect.[1]

Where a pension plan has already been established for employees, the employer may as well bring himself into the plan; provided the resulting tax savings are enough to overcome negative factors, such as the loss of possible capital gain treatment or the non-availability of committed funds.

An employer may be socially or economically motivated to establish a retirement plan for his employees. He may want to provide for the retirement years of the workers that are helping him achieve success. In other cases, an employer may have no choice but to provide a plan in order to retain good employees. Under circumstances such as these, the availability of any deduction for contributions on his own behalf helps to defray some (or perhaps even all) of the extra cost of contributing for employees. For example, if an employer is in a 50 per cent top tax bracket the effective cost of contributions for employees is immediately reduced by one-half, and contributions in his own behalf by one-fourth. Of course, the immediate tax saving on the employer's own contributions will, in all probability, be partially offset by tax due on retirement income in later years.

Even the sponsors of the original bill were sufficiently unhappy with the law as passed to introduce immediately legislation to amend it. Senator Smathers proposed bill S. 2229, and Representative Keogh, bill H. R. 8771, to eliminate the 50 per cent restriction on deductions and

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[1]Regulation 1.401-11(b)(2).

the $2,500 limit on contributions. Representative Keogh saw the bill as passed as a "camel's nose, so to speak--under the legislative tent," and further stated it should be "immeasurably simpler to amend [H. R. 10 (than to get a totally new law passed)] . . . to make it conform more closely to the principle of tax equality that this bill inherently involves."[1]

In 1965 Representative Keogh has again introduced a bill (also designated as H. R. 10) to amend the 1962 Act by liberalizing the restrictions on contributions to H. R. 10 plans and on the related tax deductions. He noted these limitations as "the major obstacles to the effective utilization of the existing law."[2] The Senate Subcommittee on Employment and Retirement Incomes likewise has recommended that Congress eliminate the limitation on contributions (where employees participate in the plan), the 50 per cent limitation on deductibility of contributions, and the 30 per cent "earned income" provision where capital is a material income-producing factor in the business.[3]

Some of the more important differences in treatment of corporate and H. R. 10 plans are summarized in Exhibit 2. These features have been discussed in somewhat more detail earlier in this section of the study.

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[1]Eugene J. Keogh, "H R 10--The Fruits of a Twelve-Year Legislative Battle for the Self-Employed," The Weekly Underwriter, December 1, 1962, p. 32.

[2]"News Report," Journal of Accountancy, February, 1965, p. 19.

[3]Paragraph 60,360, Federal Taxes Report Bulletin, June 24, 1965, Prentice Hall, Inc.

EXHIBIT 2

COMPARISON OF H. R. 10 AND CORPORATE PLAN FEATURES

Feature	H. R. 10 Plan	Corporate Plan
Per cent limitation on contributions	10% of earnings	5%, 15%, 25%*
Dollar limitation on contributions	$2,500**	No dollar limit
Limitation on deduction of contributions	50% of basic contributions for self-employed	No limit
Employees must be included after they have worked	3 Years	5 years (or longer with IRS approval)
Contributions vest in employees	Immediately	Whenever plan provides
Portion of profit considered earned whenever capital is material	30%	Stated salary (if reasonable)
Capital gain treatment permitted when proceeds from plan are received	Capital gain treatment denied to self-employed	All in one year
Distributions must not commence until	Self-employed persons are 59½ years old	No requirement
Penalties for early distribution	10% of tax penalty on owner-employee and he is denied participation for 5 years	None
Distributions must commence by	Age 70½ years	No requirement
Proceeds in respect of decedent attributable to basic contributions	Included in decedent's estate	Excluded from decedent's estate
Proceeds treated as part of $5,000 death benefit under Sec. 101(b)	Denied for self-employed	Permitted for corporate employees

*Pension plan contributions limited to 5% of compensation paid or accrued, with additional contributions permitted to fund past-service cost. Profit-sharing contributions up to 15% are allowed. Total contributions to all trusts should not exceed 25% of compensation in any year.

**This is the maximum limit on basic contributions for each owner-employee. Owner-employees may make supplementary contributions up to an additional $2,500 when employees also participate with the right to make supplementary contributions.

Plans Available Under H. R. 10

Retirement funds for H. R. 10 plans may be accumulated under a trust agreement, in a bank custodial account, in some form of insured "master" plan, or in United States Retirement Plan Bonds. Except where a bank is the trustee, however, the range of investments available to a plan is severely limited. An individual (or individuals) may serve as trustee if contributions are placed in insurance company life annuity, life insurance, or endowment policies under an approved "prototype" plan. A bank custodial agreement may be used when investments are limited to non-transferable face amount certificates, mutual fund shares, or life annuity and insurance contracts.[1] Neither a trust nor custodial account is required when contributions are all placed in non-transferable annuity contracts with life insurance companies under an approved "master" plan.

A trust is a legal entity created by a "trust agreement" between a "settler", a "trustee", and possible other parties. The trustee has a fiduciary responsibility to care for the property to which he holds title under the agreement. The trustee must carry out the terms of the trust agreement in the interest of the "beneficiaries" of the trust. In a retirement plan trust the beneficiaries are the participants in the plan. The tax treatment of taxable trusts is set forth in Sections 641 - 678 of the Internal Revenue Code. Trusts created to accumulate funds for tax-qualified retirement plans are exempt from income taxation under Code Section 501(a).

A custodial account is created by a "custodial agreement" between

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[1]Code Section 401(f)(1)(C).

a "depositor", a "custodian", and possible other parties. The custodian would generally hold title to the assets entrusted to him, but each participant is considered to be the "beneficial owner" of certain specific assets held in the account. A custodial account created to accumulate funds for a retirement plan is treated for tax purposes as a qualified trust as long as the custodian is a bank, and provided the retirement plan meets requirements for qualification.[1]

Professional associations, banks, insurance companies, or regulated investment companies may apply for approval of master or prototype plans on U. S. Treasury Form 3672 (Application for Approval of Master or Prototype Plan for Self-Employed Individuals). A master plan may be joined by self-employed persons by accomplishing a "joinder agreement." A prototype plan is one that has been approved as a model of an acceptable plan. Modifications of certain provisions may be made, and adoption by a business constitutes a distinct plan in itself. Prior approval of a master or prototype plan by the Internal Revenue Service does not relieve an employer from the responsibility of obtaining approval for his individual plan. The approval process is considerably simplified, however, when application for approval can be made on Treasury Form 3673 (Application for Approval of Self-Employed Pension or Profit-Sharing Plan as Part of a Master or Prototype Form or any Bond Purchase Plan).

Profit-Sharing Plans

There is actually less difference between profit-sharing and pension plans established under H. R. 10 than one might at first expect. Because of the limitation on contributions for owner-employees, there is little incentive for them to provide for an effective profit-sharing

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[1]Code Section 401(f).

agreement. Instead, the profit-sharing element of most H. R. 10 "profit-sharing" plans typically amounts to a restriction on contributions when profits fall below a specified level.

Somewhat representative of the restrictions imposed by H. R. 10 profit-sharing plans is the following:

> If the aggregate contributions by the Employer under the Plan for any year would exceed_____percent of the profits of Employer for such year, such contributions shall be reduced ratably as to all Participants in the Plan. For purposes of this Plan, the term "profits" means net income or net profits as determined in accordance with sound accounting principles, without any deductions for contributions under this Plan.[1]

Another profit-sharing provision simply states:

> If the net income of the Employer should be less than the aggregate contributions called for . . . , the contribution on behalf of each Participant shall be reduced ratably.[2]

United States Retirement Plan Bonds

Section 405 (added to the Code as part of the 1962 Act) effectively created a new class of Government bonds tailored to the retirement needs of self-employed persons and their employees. On January 10, 1963, the Treasury announced that United States Retirement Plan Bonds were available for purchase.[3] The new bonds are offered under the authority

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[1]This provision is part of Article III, paragraph 1, of the "Profit-Sharing Retirement Plan" of Investors Divisified Services, Inc., IRS Serial No. 639505, approved November 22, 1963.

[2]This provision is part of Article III, paragraph 1, of the prototype "Profit-Sharing Retirement Plan" of the Dreyfus Corporation, IRS Serial No. 649579.

[3]Treasury Department Announcement Letter D-719, dated January 10, 1963. See Code Section 405, Regulation 1.405-1, and U. S. Treasury Department Circular, "Regulations Governing United States Retirement Plan Bonds," Public Debt Series No. 1-63, January 10, 1963, for additional information on the new bonds.

of the Second Liberty Bond Act, as amended.

Retirement Plan Bonds may be purchased by pension or profit-sharing trusts in the names of individual participants. When investments are limited to Retirement Plan Bonds only, a "bond purchase plan" will qualify under H. R. 10 without the use of a trust or custodial account. However, the bond purchase plan must be formal and communicated to employees.

United States Retirement Plan Bonds bear interest at 3 3/4 per cent per annum, compounded semi-annually, starting from the first of the month in which the bonds are issued. Interest accumulates and is paid only upon redemption of the bonds. The bonds must be purchased in the names of individual participants, although they may be physically held by trusts or by employers. The bonds cannot be redeemed prior to the time that a participant attains age 59½ years. except in cases of death or disability of the participant. The bonds cease to bear interest five years after the death of the individual in whose name they are purchased.

Retirement plan Bonds are available in denominations of $50, $100, $500, and $1,000. Not more than $5,000 face value of Retirement Plan Bonds may be purchased during one year for any one person, but otherwise the "excess contribution" rule imposed by Code Section 401(d)(5) on owner-employees does not apply. The maximum deduction allowed on the tax return of a self-employed person for contributions in his own behalf is of course limited to $1,250 in any case.

Capital gains treatment is specifically denied for proceeds from Retirement Plan Bonds, whether or not the recipient is a self-

employed person.[1] The bonds are subject to estate and inheritance taxes, but are exempt from State and municipal income taxes.

Retirement Plan Bonds are issued only by Federal Reserve Banks or the Treasury Department, but applications for purchase may be made through banks, trust companies, and post offices. Application is made on Treasury Department Form PD 3550, "Application for and Proof of Purchase of United States Retirement Plan Bonds".

A bond purchase plan may be established by devising, and communicating to employees (if any), a formal plan that is in conformity with H. R. 10 provisions.[2] U. S. Treasury Department Form 3673, "Application for Approval of Self-Employed Pension or Profit-Sharing Plan as Part of a Master or Prototype Form or any Bond Purchase Plan," must be submitted to Internal Revenue Department for formal approval of the plan. Treasury Department Form 2950SE, "Self-Employed Retirement Deduction (Statement in support of deduction for payment to a qualified pension, profit-sharing, annuity or bond purchase plan for self-employed individuals)," must be submitted annually in support of deductions for contributions to the plan.

Mutual Fund Retirement Plans

Mutual funds are professionally managed investment cooperatives. They generally reinvest shareholder investments in securities of other companies so as to attain considerable diversification. Most mutual funds qualify as "regulated investment companies" under the Code.[3]

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[1]Code Section 405(e).

[2]See the section of this study starting at page 28 for a summary of H. R. 10 provisions.

[3]Code Sections 851-855.

One of the requirements of Section 851 of the Code is that the investment company either must be registered under the Investment Company Act of 1940, or must be a certain type of common trust fund.[1]

Regulated investment companies may avoid paying tax on income (including capital gains) that is distributed as dividends in the current year, as long as dividends (other than capital gain dividends) are distributed equal to at least 90 per cent of "investment company taxable income," as defined in Code Section 852(a)(2). Capital gain distributions normally retain their identity, and are taxed as such to shareholders.

Ordinarily, most of the income realized by a mutual fund is "distributed" (and taxed) currently to its shareholders. In actuality, there need be no real payment, as long as investors report their shares of the fund's income in their personal tax returns. Their portions of income may be automatically "reinvested" for them.

In addition to professional management of diversified investments, mutual funds that have substantial investments in common stocks also claim to offer considerable protection against inflation. It is said that stock prices generally move in the same direction in the long run as does the price level. No one claims that such a correlation exists in the short run, however. Also, it must be recognized that a long run decrease in price level likely would be accompanied by a decrease in the values of common stocks.

At any rate, participants in retirement plans must recognize that fixed-dollar claims in the future are not without risk, regardless of the quality of the claim. Actually there are two predominant trends

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[1]Code Section 851(a).

that deserve consideration in evaluating such risks. One is the inflationary trend of increasing price levels; the other is the continuously increasing standard of living. The latter trend can magnify the discontent felt by retired persons when they find themselves with inadequate incomes. Mutual funds claim to provide for some protection against both of these types of risk.

When investment in a mutual fund constitutes an H. R. 10 pension plan, the income "distributions" that are reinvested in the fund are not taxed to anyone until proceeds are actually paid to participants in the plan. A participant would not normally receive proceeds until after he retires. It is important to note here that H. R. 10 proceeds resulting from contributions by self-employed individuals are never eligible for capital gain treatment, regardless of the type of plan that is utilized.[1]

Mutual fund shares may be held by a trustee or in a custodial account to fund a plan that was originated especially for a particular employer. Also, regulated investment companies, banks, or professional associations may devise prototype or master plans that require that investments be made in mutual fund shares.

Mutual fund shares would normally be purchased for a retirement plan in the name of the trustee or custodian. Some mutual funds are associated with a related corporation that qualifies as a bank and can act as trustee or custodian for qualified plans.[2] Other funds have

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[1]Code Sections 402(a)(2) and 405(e).

[2]For example, Investors Diversified Services, Inc., acts as custodian for its profit-sharing prototype plan (I.R.S. Serial No. 639505, approved November 22, 1963) for mutual fund shares purchased from Investors Mutual, Inc., Investors Stock Fund, Inc., Investors Variable Payment Fund, Inc., and Investors Selective Fund, Inc.

arrangements with a regular commercial bank to act as custodian or trustee, or permit the employer to arrange for his own custodian or trustee.[1]

Periodic contributions to mutual fund plans are used to purchase mutual fund shares to accumulate funds for the retirement years of self-employed persons and their employees. Mutual fund plans may contain a "profit-sharing" restriction. The plans generally offer a number of options to the retiring participant. He can choose to receive the value of his interest in the fund in a lump sum of cash or in shares. He may choose to have the cash value of his interest converted to a fixed dollar annuity for life or for a fixed number of years. Or he might be permitted to leave his investment in the mutual fund and receive periodic amounts in liquidation of his interest in the fund.[2] Another alternative sometimes allowed is the conversion of a participant's interest in the fund to Retirement Plan Bonds. The reason for direct conversion to some pay-out method, rather than a distribution in cash for reinvestment, is to defer taxation of the proceeds until they are actually used by the retired individual for his support. The proceeds are taxed to the participant in the year they are first received by him.

Face Amount Certificates

Face amount certificates are contracts under which the borrower

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[1]For example the Dreyfus Corporation prototype profit-sharing plan (I.R.S. Serial No. 649579) for the Dreyfus Fund Incorporated does not name a specific custodian. However, it has a working agreement with The Bank of New York, and provides an application form for establishing a custodial account with that bank.

[2]Illustrations of such arrangements are the "Systematic Pay-Out Plans" offered by Investors Stock Fund, Inc. and Investors Mutual, Inc.

agrees to repay a specified amount at a predetermined future date. The interest accumulates and is a part of the face amount that is to be repaid. Optional settlement provisions may be included in the contract. A "Single Payment Face-Amount Certificate" is something like a long-term discounted note, except that typically an individual is the leader, while the borrower is a financial corporation. "Term Installment Face-Amount Certificates" are paid for in installments over a specified number of periods. Like single payment certificates, the interest return is included in the face amount of term installment certificates.[1]

Non-transferable face amount certificates are approved investments for H. R. 10 retirement plans.[2] The certificates may be held in a custodial account without the employment of a trust, as long as investments of the plan are limited to these certificates, mutual fund shares, or life annuity and insurance contracts.

Fixed-Dollar Annuities

Insurance companies have traditionally offered "policies" of a type that accumulate to a certain value by some future date. Usually these contracts are paid for in periodic installments. The proceeds may be received either in a lump sum or over a period of years. If payments by the insurance company are to continue until the death of the

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[1]Investors Syndicate of America, Inc., is a corporation that deals principally in face amount certificates. For information about face amount certificates see that company's Primary Prospectus of April 13, 1965, and the "Supplemental Prospectuses" dealing with the different series of certificates. The yield to maturity, compounded annually, on the certificates offered by Investors Syndicate in the aforementioned Prospectus varies from 1.16% for the 6-year series paid for on a monthly basis to 3% on the 20-year, single payment series. Additional yield credits have been voted by the Board of Directors of the Company since 1947 that have gradually raised the annual yield from an additional ¼% in 1947 to an additional 1¼% in 1965.

[2]Code Section 401(g).

annuitant, the arrangement is called a straight life annuity. It has been said that "an annuity is the only known vehicle for guaranteeing an income which cannot be outlived"[1]

Annuities in the past have generally been "fixed-dollar" arrangements in which the issuing company agrees to pay a certain number of dollars under the particular pay-out agreement. When the possibility of purchasing power changes are considered, fixed-dollar contracts are not as riskless as is sometimes assumed. Both increases in price levels and increases in the general standard of living have tended to diminish the satisfaction accompanying a fixed-dollar income during recent years.

A number of insurance companies have devised prototype and master plans that have been approved under H. R. 10. Generally, contributions to insurance company plans are used to build up either a group annuity or an individual annuity for each participant. Participants may have the option of choosing a lump-sum, straight life, cash refund, installment refund, period certain, or joint and survivor annuity arrangement for receiving proceeds. As with other types of plans, capital gains treatment is denied for proceeds attributable to contributions for self-employed individuals.

An H. R. 10 insurance company plan can be of the "scheduled benefit" type, but is more apt to be a "money purchase" arrangement. Under a "scheduled benefit" plan the employer contributes whatever amount is required to provide employees with a specified amount of income after

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[1]Bogikes, G.W. and Suter, C.F., "How To Take Advantage of The Keogh Act," Journal of D.C. Dental Society, February, 1965. p. 4 (Reprint).

their retirement.[1] The level of retirement benefit provided may be determined by the participant's salary class while he was working.

Because his operation is apt to be small and relatively unstable, a self-employed person is likely to prefer a "money purchase" plan. Under this arrangement the employer simply contributes a certain percentage of each employee's income, and their retirement income is then determined by the amount contributed in their behalf during their working years.[2] A "profit sharing" restriction is also easily inserted into a "money purchase" plan.

Variable Annuities

Variable annuities are a relatively recent investment innovation. The striking difference between a variable and a fixed-dollar annuity is that the proceeds from a variable annuity fluctuate with the changes in values of the securities in the investment fund.

Under a variable annuity the annuitant is entitled to a certain number of "annuity units" per period, rather than to a certain number of dollars. The value of an annuity unit changes over time as the values of securities in the fund, and the income from those securities, fluctuates.

An insurance company bears little or no "investment risk" under a variable annuity contract. It simply credits participants with their shares of the yields and gains or losses on the investments in the fund

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[1]For an example of a "scheduled benefit" plan for self-employed persons see Aetna Life Insurance Company's prototype plan, IRS Serial No. 644260, approved April 16, 1964.

[2]For an example of a "money purchase" plan for self-employed persons, see Aetna Life Insurance Company's prototype plan, IRS Serial No. 644261, approved April 16, 1964.

after adjustment for expenses, reserves, etc.

Variable annuities are said to provide some protection against purchasing power changes and against changes in the standard of living. This protection is supposed to stem from the reinvestment of contributions to the plan in corporate equity shares. In many respects variable annuities are very much like the "Systematic Pay-Out Plans" offered by some Mutual Funds.[1] Professional management and diversified investments in equity issues are present in both cases.

Strictly speaking, a variable annuity pertains only to years after retirement. The years prior to retirement are termed the "funding period" during which funds are being built up to support the annuity. Equity shares may be employed for "equity funding" to provide an amount to buy a fixed-dollar annuity at retirement. When a variable annuity is elected, equity funding is likely to be chosen as well, and for the same reasons.

A 1959 Supreme Court decision held that variable annuities are subject to the jurisdiction of the Securities and Exchange Commission.[2] Such annuities must, therefore, be offered through a prospectus.[3] An insurance company offering variable annuities is subject to the jurisdiction of both the Securites and Exchange Commission and the insurance commissions.

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[1]See page 49 of this Chapter.

[2]SEC vs Variable Annuity Life Insurance Company of America, et. al., 359 U. S. 65 (1959).

[3]See The Prudential Insurance Company's Prospectus for its "Group Variable Retirement Annuity Contracts (for Retirement Plans of Self-Employed Persons)," dated July 27, 1964, for an example and for additional information on variable annuities.

Split-Funding Plans

Fixed-dollar annuities, insurance contracts, and Government Bonds have the advantage of assuring an income of a certain number of dollars per period after retirement. Variable annuities, mutual fund shares, and other plans funded with equity shares give some protection against changes in purchasing power, and also allow participants to share in general changes in prosperity.

Many people claim that a judicious mixture of fixed-dollar and variable contracts provides the most sensible retirement plan. The mixture most ofter mentioned is an allocation of one-half of contributions to fixed-dollar contracts and one-half to variable contracts. Some split-funding plans allow each participant to choose how his contributions are to be divided between fixed-dollar and variable contracts.

Professional Association Plans

Employers may, of course, devise their own plans and submit them to the Internal Revenue Service for approval. In so doing they can create their own funding trust with a bank as trustee, or use one or a combination of the other arrangements that have been mentioned.

Few self-employed persons, or partnerships, are large enough to afford the expense of having a unique plan devised, approved, and administered. Professional and trade associations may, however, originate master or prototype plans that are suited to the needs of thier membership. The American Institute of Certified Public Accountants (AICPA) and the American Bar Association (ABA) are among the professional associations that have created such plans for their memberships. A brief summary of the plans made available to their memberships by these

associations should provide some idea of the nature of association retirement plans.

AICPA Plans. The AICPA retirement program consists of two master plans—one called the "Members' Plan" and the other the "Employees' Plan." Both plans must be adopted if a member wishes to participate. Only the Employee's Plan need be adopted if no member is participating. The Members' Plan contains the H. R. 10 restrictions on owner-employees and self-employed employees. Both plans are administered by the Trustee, Manufacturers Hanover Trust Company, New York, under the direction of a Retirement Committee appointed by the AICPA Executive Committee. The plans were approved by the Internal Revenue Service on March 27, 1964 (IRS Serial No. 646162).

Each firm joining the Plans elects a basic contribution rate from 3 per cent to 10 per cent that is applied to "effective earnings" of participating members and employees. The firm may designate a figure between $10,000 and $50,000 as the maximum earnings on which contributions will be made, in which case only earnings below that maximum are "effective earnings." "Effective earnings" of members are their net earnings from self-employment after deducting pension contributions for employees, but not more than the maximum designated. Each firm may also elect to permit voluntary supplementary contributions by participants up to an additional 10 per cent of their effective earnings.

One-half of basic contributions and all supplementary contributions to the Employee's Plan go automatically into Group Annuity Contracts with The Mutual Life Insurance Company of New York. The other half of basic

contributions is invested in equity securities by the Trustee. The Group Annuity Contracts are also held by the Trustee.

Contributions to the Members' Plan all go into Group Annuity Contracts until such time as questions concerning registration of the Plan with the Securities and Exchange Commission are resolved. Upon the resolution of those questions members may choose to have one-half of their past contributions, and earnings attributable to them, converted from Group Annuity Contracts to the equities fund. Also, members may choose at that time to have one-half of future contributions invested by the Trustee in the equities fund.

Firm contributions to the Employees' Plan vest in employees immediately whenever any "owner" of the firm is also participating in the Plans. If only employees are participating, however, the benefits attributable to firm contributions do not vest in employees until they have completed either 20 years continuous service or 10 years participation in the plan. Three years continuous service to the firm is a prerequisite to participation by either employees or members.

Upon becomming permanently disabled a participant who has participated at least one year is entitled, without further contributions, to benefits at age 65 that approximate his prospective pension. Such a disabled participant may choose to receive the present value of his benefits in a lump sum, or in a reduced annuity commencing prior to age 65. If a participant dies prior to his retirement his vested interest in the Plans will be paid to his beneficiary. Except in cases of death or disability, participants can expect to receive their interest in the Plans as a fixed-dollar straight life annuity commencing after age 55

(after age 59½ for owner-employees), but normally at age 65. In lieu of the straight life annuity, a participant may elect to receive a lump sum, period certain, joint and survivor, or installment refund annuity. Commencement of benefits does not depend on actual retirement.

Certain administrative and investment fees are paid to the Trustee for his services. Each firm must pay an initial entry fee of $10, plus $5 each for the first 20 participants, and $2 each for additional participants, up to a maximum entry fee of $250. Annual charges of $4 for each participant, plus an additional $3 for each participant who makes supplemental contributions, must also be paid to the Trustee. These charges are in addition to regular contributions, and are subject to change as conditions warrant. Dividends or experience refunds on the Group Annuity Contracts are applied against expense charges and against the firm's basic contribution requirements.

In addition to administrative charges, the Trustee's annual fee for investment management is 1/2 per cent on the first $5,000,000 of average market value of investments, 1/4 per cent on the next $5,000,000, and 1/8 per cent on the excess value over $10,000,000. The investment management fee is charged against investment income received by the Trustee.

Five per cent of funds deposited with the Insurance Company are applied to coverage of its administrative and other expense. Also, 2 per cent of the first $2,500 of annual contributions for each participant is applied to the cost of providing disability benefits under the plans.

ABA Plan. The ABA retirement program consists of a "Pooled Trust" and Group Annuity Contracts. The Trustee for the plan is the Continental Illinois National Bank & Trust Company of Chicago. The plan was approved by Internal Revenue Service on November 12, 1963 (IRS Serial No. 639103). The "Pooled Trust" consists of an Equity Fund and a Fixed Income Fund. Contributions to the Fixed Income Fund are invested in Government and corporate bonds and in other fixed income securities.

Participants in the ABA Plan may elect the proportions of their contributions that are to go into the Equity Fund, the Fixed Income Fund, and to the purchase of deferred annuity contracts. Participants may shift investments from one Fund to the other in the Pooled Trust, but not more than one such shift may be made each year.

The ABA Plan permits voluntary supplementary contributions by participants up to an additional 10 per cent of their compensation (or $2,500 if this is less than 10 per cent of compensation). All contributions vest immediately in participants. Voluntary supplementary contributions invested in the Pooled Trust may be withdrawn at any time, but earnings on such contributions may not be withdrawn.

The employer designates when he joins the Plan the per cent (not over 10 per cent) of earnings that he is to contribute on behalf of participants. He may also elect to designate a limiting per cent of his earned income that may be paid as contributions to the Plan. The latter option is the so-called "profit-sharing" restriction.

Participants may elect to receive benefits as a lump-sum payment, life annuity, joint and survivorship annuity, life annuity with 10 years

certain, or life annuity with a sum certain guaranteed. As an additional option, a participant in the Pooled Trust may elect to leave his interest in those Funds upon retirement and to receive payments in liquidation of such interest over a fixed number of years. The amount of each annual payment is determined by dividing the value of the participant's accounts by the number of payments remaining to be paid.

In the event of permanent disability, a participant may commence receiving such benefits as his interest in the plan will provide. Upon death of a participant, his interest in the Plan is paid to his beneficiary.

Trustee's fees are paid from the accounts of participants. There is a charge of $10 for each participant in the first year, and $5 per year thereafter. Investment fees are charged to the Funds on a quarterly basis at 1/8 per cent per quarter on the average net asset value up to $10,000,000, 1/10 per cent of the next $10,000,000, 3/40 per cent of the next $5,000,000, and a negotiated charge for any excess over $25,000,000 of value. The negotiated charge is to be based on the experience with the first $25,000,000 of investments.

The American Bar Retirement Association charges $5 for the "retirement packet" containing documents and forms, and $15 enrollment fee for each employer who adopts the Plan. No indications are given in "packet" materials of any expense charges by the insurance company that is selected to provide Group Annuity Contracts.

Investment in the Pooled Trust is offered through a prospectus dated October 12, 1964 (which incorporates a prospectus dated November 15, 1963) that has been registered with the Securities and Exchange Commission.

Economic Consequences of H. R. 10

Since indications are that, so far, very few people are involved in H. R. 10 retirement plans, H. R. 10 could not have resulted in economic changes of any consequence yet. There still remains the question, however, of just what economic effects might result from widespread use by self-employed persons of qualified retirement plans.

No attempt has been made in this study to seek out and evaluate empirical evidence on the economic effects of the Act. Neither has there been any effort to thoroughly evaluate from a theoretical viewpoint the consequences that might be expected from H. R. 10. This section of the study is included only to suggest that there are macroeconomic consequences of any legislation that changes the relative desirability of different courses of action.

Suppose H. R. 10, and perhaps subsequent amendments, does encourage self-employed persons to contribute considerable amounts to tax-qualified plans. The amounts contributed would have to be diverted either from other forms of saving or from expenditures on consumption. To the extent that aggregate consumption expenditures are reduced there would be a decrease in the average "marginal propensity to consume" and an increase in the average "marginal propensity to save". This shift in propensities would tend to depress demand for goods and services.

Conceivably, there might be very little increase in overall saving, but rather a diversion from other types of saving by individuals may occur. If direct investments in high-grade securities are diverted to plans that also invest in high-grade securities, economic changes would be negligible. Any additional demand for such securities due to

the current tax savings on contributions to qualified plans, and on earnings that are locked into such plans, might drive the prices of high-grade securities up, and their yields down, somewhat.

It is probably more likely that there would be considerable diversion of investments in risky ventures to investments in low-risk enterprises. Self-employed persons are important suppliers of high-risk money. They invest much of their savings in their own firms and in those of their acquaintances. Professional and other self-employed persons are often more enterprising by their nature, and have less aversion to risk, than persons who work for corporations or for the Government.

Pension fund contributions are made to financial institutions such as banks, insurance companies, mutual funds, etc. Financial institutions traditionally have been conservative in their investment practices. They invest largely in Government bonds, corporate bonds, real estate mortgages, and high-grade corporate stocks.

If the supply of low-risk funds increases, the yield rate on such investments could be expected to decrease. This should result in a lower "cost-of-capital"[1] to low-risk users, an increase in the volume of their capital investments, and to some stimulation of aggregate demand. On the other hand, a decrease in the availability of high-risk

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[1]"Cost of Capital" might be defined as the true cost of a quantity of funds for a given period of time. For discussions on "Cost of Capital" see The Theory of Financial Management, by Ezra Soloman (Columbia University Press, 1963), and The Capital Budgeting Decision, by Bierman and Smidt (Macmillan, 1963).

money would likely result in increased yields to these funds. The "cost-of-capital" for high-risk firms would increase, and investments made by such firms would likely decrease. The overall impact on the capital market of large-scale adoption of H. R. 10 plans would seem to be damaging to small business (generally needing high-risk funds) and helpful to large, successful corporations.

Any increase in the level of contributions to tax-qualified retirement plans can be expected to result in a decrease in current income taxes collected. Increasing payments by pension plans of previously untaxed incomes will eventually compensate for some of any current tax loss. Also, the secondary effects on aggregate demand, and on national income, may either add to or decrease the primary tax effect. For example, if expenditures on consumer goods are diverted to retirement plans, demand will decrease and, conceivably, so will national income (unless there was "excess demand" present). If the retirement plan funds are channeled into new investments, some or all of the negative effect on national income might be offset. This depends, however, on the existence of a demand for new investment funds. Changes in national income normally can be expected to result in corresponding changes in tax collections. This relationship may be aggrevated by an inverse relationship between the level of national income and the need for Government expenditures.

Other economic and social changes can be expected to accompany any increase in "effectiveness" of H. R. 10. Some of the effects of increasing investments in pension plans have already been touched upon in Chapter II of this study. There are several instances, however,

where H. R. 10 provisions might be expected to bring about changes that contrast with those resulting from traditional pension programs.

The H. R. 10 feature requiring immediate vesting of employee rights should not discourage labor mobility as much as do corporate plans that are designed to tie employees more closely to their employers. Employee participants in H. R. 10 plans may leave their employers without sacrificing any of their interests in the plans; under most corporate plans all interest in the plans attributable to corporate contributions are forfeited by employees who quit their jobs.

Another contrast between H. R. 10 and traditional plans is their relative preference toward older employees. Most corporate plans that have resulted from negotiations with employees provide "scheduled benefits" for retiring employees that depend neither on length of service nor years of participation in the plan. This feature makes employers reluctant to hire older employees, for whom pension benefits are very costly. On the other hand, there is no penalty for employing young, highly mobile employees when their pension benefits are forfeited if they leave the firm for another job. The H. R. 10 provisions requiring that all employees be included in the plan after three years of service, and the immediate vesting of all contributions in employees, tend to discourage the employment of young, mobile employees. Young women, especially, can be expected to marry and eventually leave their jobs to care for their families.

Most H. R. 10 plans provide benefits on a "money purchase" basis. A fixed percentage of each employee's earnings is contributed to the plan, and benefits are provided in whatever amount such contributions will afford. Whereas "scheduled benefit" plans tend to discourage the hiring of older workers, "money purchase" plans do not.

CHAPTER IV

FORMULAE FOR EVALUATING RETURNS TO H. R. 10 PLANS

Contributing to a retirement plan is one form of investing. Wealth can be accumulated in numerous ways, including contributions to tax-qualified pension plans. Except for possible tax obligations, cash proceeds from any form of wealth are just as useful as an equal amount of proceeds (at the same time) from any other source. Alternative vehicles for accumulating wealth are almost always available. The problem is to choose the most favorable investment form under any individual set of circumstances.

The choice is difficult to make because many decision factors are not quantifiable. An individual may choose to invest in his own stock portfolio because he enjoys being a stockholder. People have different attitudes about conforming to, or departing from, investment forms that are currently popular. In some cases, the investor may be strongly influenced by a responsibility to provide for his own support, or for the support of others. Many people undoubtedly have invested in Government bonds, especially during wartime, largely for patriotic reasons. These and other non-quantifiable considerations may lead individuals to choose investments that do not maximize their expected money returns.

In addition to the elusive considerations just mentioned, certain other factors are difficult to quantify under currently developed methods of measurement. For example, not much has been accomplished so

far in effectively integrating levels of risk, and particularly personal preferences for risk levels, into an investment analysis. Another consideration that is not easily quantifiable is the preference for having the cost of, or the proceeds from, an investment occur during particular time periods. This is not the same problem as incorporating the "market" effect of the time value of money, but is concerned instead with an individual's own preference for funds, or the desire to invest funds, in particular time periods.

The remainder of this study will not be concerned with the non-quantifiable aspects of investment choice, the effects of risk, or time preferences for money, except for warnings from time to time that such factors cannot be ignored by individual investors. In this Chapter, formulae are developed for evaluating the profitability of investments--specifically, investments providing proceeds after retirement. Chapter V will use the framework developed here to evaluate retirement plans that may be available under H. R. 10.

The so-called "capital budgeting techniques" would appear to be applicable to the evaluation of the profitability of almost any kind of investment. The most significant feature of these techniques is their incorporation of the time value of money into the evaluation of profitability. They attempt to get all value elements to equivalent "time value" units in one of the relevant years. Most frequently, the approach is to work with values in the period in which the investment is being considered--in other words, with present values.

One popular approach to the evaluation of an investment opportunity is to offset the present value of incremental cash outlays against the present value of future proceeds, to arrive at a net present

value of the investment alternative. This approach is oftentimes called the "net present value" method of evaluation.

The rate used in determining present value may be the rate of return available on some alternative investment, or perhaps the theoretical "cost of capital" rate.[1] If the rate of return available on an alternative investment is used, a positive net present value would endorse the investment being evaluated as a "good" investment. If the "cost of capital" is used in the analysis, all alternatives that result in positive net present values are "favorable" investments. However, some alternatives will be more favorable than others. Available investments may be ranked according to the size of their net present values whenever investment funds are limited, or when projects are conflicting.[2] Then the most profitable alternative(s) may be selected.

Another approach involves finding the rate of return that equates the present value of incremental cost outlays with the present value of future proceeds. This is known as the "rate of return" method, and offers some advantages over the "present value" approach. Probably the most important advantage of the "rate of return" method is that the resulting rate is calculated without any assumptions about "cost of capital." Also, the resulting rates are themselves indices of the relative profitability of the investment alternatives under consideration. On the other hand, rate of return is generally more difficult to determine, mathematically, than is net present value.

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[1]See footnote 1, page 61, Chapter III of this study for a definition of "cost of capital" and for suggested references.

[2]Conflicting projects are those that cannot, for any reason, be chosen simultaneously. For instance, a self-employed person may have the choice of installing either an insurance company annuity plan or a plan provided through his professional association, but not both.

Generally, it will be up to each self-employed person to decide for himself whether investment in a retirement plan is attractive to him. On occasion, the problem may be a joint one, when partners in a partnership must decide on whether or not to institute an H. R. 10 plan. Even in this situation, however, it is likely that each partner will be for or against the plan when it is considered in the light of his own share of cost and proceeds. His cost each year will be the amount by which his share in partnership profits can be expected to be less than it would have been without the plan. Therefore, the problem will be viewed as always one that confronts an individual self-employed person.

Identification of Symbols

In developing the formulae for evaluating the profitability of retirement investments, the following symbols will be used:

x = years from the present until date of retirement

x' = years from date of retirement until the end of the retirement annuity

i = rate of return, after income taxes, on investments in the retirement plan

r = stated or estimated rate, before taxes, to be earned directly on investments by the pension plan

t = self-employed person's marginal tax rate prior to retirement

t' = self-employed person's marginal tax rate after retirement

C_p = annual basic contributions on behalf of self-employed person

C_s = supplementary contributions, if any, by the self-employed person

C_e = annual basic contributions on behalf of employees

F = present value factor for \$1 for x years = $\frac{1}{(1 + i)^x} = (1 + i)^{-x}$

f = present value factor for \$1 per year for x years

$$= \frac{1 - \frac{1}{(1 + i)^x}}{i} = \frac{1 - (1 + i)^{-x}}{i}$$

f' = factor to obtain the value, at date of retirement, of \$1 per year for x' years $= \dfrac{1 - \frac{1}{(1 + i)^{x'}}}{i} = \dfrac{1 - (1 + i)^{-x'}}{i}$

g = future value factor for \$1 per year for x years

$$= \frac{(1 + r)^x - 1}{r}$$

h = factor to amortize \$1 over x' years $= \dfrac{r}{1 - \frac{1}{(1 + r)^{x'}}}$

$$= \frac{r}{1 - (1 + r)^{-x'}}$$

C_t = present value of cost of the retirement investment

G = accumulated value, at date of his retirement, of the contributions for the self-employed person

P = annual proceeds to the self-employed person from an annuity after his retirement

B = total tax basis for the annuity

V = present value of all expected proceeds from the retirement investment

Rate of return (i) and stated yield (r) are assumed to be yearly rates, compounded annually. Illustrative examples would be complicated, and little would be gained in actual analysis, by compounding more frequently.

Equation to Obtain Present Value of Cost

Under both the net present value and rate of return approaches an equation for arriving at the present value of incremental cost of the investment is needed. The following equation is proposed as a means of

obtaining the present value of the cost of investing in an H. R. 10 plan:

$$C_t = f\left[(C_p + C_e + C_s) - t(C_e + \tfrac{1}{2}C_p)\right]$$

$$= \frac{1 - (1 + i)^{-x}}{i}\left[(C_p + C_e + C_s) - t(C_e + \tfrac{1}{2}C_p)\right]$$

In words, the foregoing equation arrives at the present value of the after-tax cost of contributions by the self-employed individual for himself and for his employees. Annual tax deductions are unaffected by supplemental contributions. The tax saving each year is the expected marginal tax rate times the total of basic contributions for employees and one-half of basic contributions for the self-employed person.

Several assumptions are implicit in the equation. One is that the contributions are the same each period. It may be that the best estimate at the time the alternative investments are being considered is that contributions will be at a level amount. Certainly, when no employees are participating (when $C_e = 0$), and where the contributions for the self-employed person are expected to be at the $2,500 maximum each year, the assumption is acceptable. When there is reason to believe that contributions will be at different levels, the equation must be changed to arrive at the summation of the present values of whatever the after-tax cost of contributions are expected to be.

Another assumption is that the marginal tax rate (t) also remains constant over the relevant years. Actually, the equation represents a summation of the present values of each year's after-tax cost for the investment. If the variables are expected to change each year, then the equation

$$C_t = \sum_{n=1}^{N}\left\{(1 + i)^{-n}\left[(C_p + C_e + C_s) - t(C_e + \tfrac{1}{2}C_p)\right]\right\}$$

would be more applicable, with the values for all variables being substituted at their expected amounts for each year. It is unlikely, however, that expectations will be so refined that variations by years can be predicted. Perhaps more probable would be an expectation that the marginal tax rate (or some other variable) may change at some approximate future date. In that case the problem can be viewed as two (or more, as the case may be) streams of payments, each returned to present value and summed. Consider, for example, a situation where it is expected that at the end of $\underline{n}$ years the marginal tax bracket and contributions will increase to $\underline{T}$, $\underline{C_p}'$, $\underline{C_s}'$, and $\underline{C_e}'$ for the remaining years until retirement. The equation for this situation would be:

$$C_t = \frac{1 - (1 + i)^{-n}}{i}\left[(C_p + C_e + C_s) - t(C_e + \tfrac{1}{2}C_p)\right]$$

$$+ (1 + i)^{-n}\,\frac{1 - (1 + i)^{-(x-n)}}{i}\left[(C_p' + C_e' + C_s')\right.$$

$$\left. - T(C_e' + \tfrac{1}{2}C_p')\right]$$

Consider now an example consisting of the following ten assumptions:[1]

1. A self-employed person is considering adopting an H. R. 10 retirement plan and making contributions of 10 per cent of earnings. No supplemental contributions are to be made.
2. He expects to achieve profits from his business of $25,000 per year, after pension fund contributions for his employees.
3. Invested capital is not a material factor in his business.
4. Employees' wages are expected to be $5,000 per year.
5. Employees have been employed longer than 3 years, and therefore must be included in the plan.

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[1]The assumptions here stated are not necessarily realistic, but are made so as to simplify the illustration of the proposed technique. Some results obtained from various combinations of values for variables are presented in Chapter V and in Appendix B.

6. The institution of a pension plan is not expected to result in lower base wages at any time in the future.

7. The self-employed person is presently 45 years old, and he plans to retire at age 65.

8. A 5 per cent return after tax can be earned on an alternative investment that is considered to be otherwise as desirable as pension plan investments.

9. No monetary inflation of consequence is anticipated in the years involved.

10. The marginal tax rate of the self-employed person is expected to be about 30 per cent each year until his retirement.

To determine the present value of after-tax costs, the formula suggested was:

$$C_t = \frac{1 - (1 + i)^{-x}}{i}\left[(C_p + C_e + C_s) - t(C_e + \tfrac{1}{2}C_p)\right]$$

Substituting the values in the example for the variables in the equation:

$$C_t = \frac{1 - (1 + .05)^{-20}}{.05}\left[(2{,}500 + 500 + 0) - .30(500 + \frac{2{,}500}{2})\right]$$

$$= 12.462\left[3{,}000 - .30(1{,}750)\right]$$

$$= 12.462\left[2{,}475\right]$$

$$= 30{,}843$$

Therefore, the present value of the cost of the retirement plan, given the assumptions, and from the standpoint of the self-employed individual, is approximately $30,843. The factor for

$$f = \frac{1 - (1 + .05)^{-20}}{.05}$$

can be obtained from a present value table, thereby saving the trouble of performing the calculation.[1]

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[1]The factor 12.462 in this example was obtained from Table 1, "Analysis of Capital Investments," Tables for Use in Analyzing Business Decisions, Jerome Bracken and Charles Christenson, (Irwin, 1965), p. 28.

Equation to Obtain Present Value of Proceeds

Both the net present value and rate of return approaches require an equation for obtaining the net present value of proceeds from the investment. Proceeds might be received in a number of different ways, depending on the particular plan and the options permitted.

The simplest situation is one where proceeds are received in a lump sum upon retirement. The following equation should provide the present value equivalent of a number of dollars, after taxes, x years from now:

$$V = F\left[G - t'(G - B)\right] = (1 + i)^{-x}\left[G - t'(G - B)\right]$$

G has been identified as the accumulated value of contributions for the self-employed person at the date of his retirement. The number of years from the present until time of retirement is x. The marginal tax rate at which the taxable portion of G will be taxed is t'. The tax on H. R. 10 plan proceeds received by a self-employed person all in one year is limited to five times the increase in tax that results from including 20 per cent of the taxable portion of proceeds in the return for the year.[1] This provision must be kept in mind when t' is determined.

The tax basis for the investment is:

$$B = x(\tfrac{1}{2}C_p + C_s)$$

The foregoing represents the portion of contributions for the self-employed person that was included in his taxable income in the years in which the contributions were made. If supplemental contributions were

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[1]Code Section 72(n)(2).

not made, the tax basis would be:

$$B = x\tfrac{1}{2}C_p$$

By simply using $\underline{G}$ as the amount of proceeds to be received upon retirement, it is implied that a value for $\underline{G}$ can be estimated at the present time. If the contract under consideration guarantees the yield rate ($\underline{r}$) to be delivered on investments in the plan, then:

$$G = g(C_p + C_s) = \frac{(1 + r)^x - 1}{r}(C_p + C_s)$$

If the yield rate is not guaranteed, then $\underline{r}$ must be estimated in order to arrive at the approximate future value, at retirement, of the contributions being made for the self-employed person.

The equation for the present value of lump-sum proceeds, subject to the assumptions made, can now be stated as:

$$V = (1 + i)^{-x}\left\{\left[(C_p + C_s)\frac{(1 + r)^x - 1}{r}\right]\right.$$

$$\left. - t'\left[(C_p + C_s)\frac{(1 + r)^x - 1}{r} - x(\tfrac{1}{2}C_p + C_s)\right]\right\}$$

or $$V = F\left\{\left[g(C_p + C_s)\right] - t'\left[g(C_p + C_s) - x(\tfrac{1}{2}C_p + C_s)\right]\right\}$$

Now consider the somewhat more complex situation where proceeds are to be received in installments after retirement. The accumulated value ($\underline{G}$) at retirement date can be estimated in the manner previously shown. Given an amount at a certain date, a periodic annuity from that date can be estimated in the following manner:

$$P = Gh = G\frac{r}{1 - (1 + r)^{-x'}} = (C_p + C_s)\frac{(1 + r)^x - 1}{r}\frac{r}{1 - (1 + r)^{-x'}}$$

The expected yield rate ($\underline{r}$) might be the same after the date of retirement as it was for investments before retirement. This is likely to be true, for instance, for an annuity contract. If the yield

rate is going to be different after retirement, as it would be if mutual fund shares were converted to an annuity at time of retirement, then the yield rate after retirement must be substituted for r in the second element (h) of the foregoing equation.

The years over which installments are to be paid (x') may be known, as in the case of a temporary annuity, or estimated, as for a life annuity. If a life annuity is chosen, then the expected life of the annuitant would probably be obtained from a life expectancy table. Adjustments would have to be made for accommodations such as "numbers of years certain," "sums certain," or for "joint and survivorship" options elected.

Whenever proceeds are received in installments, the tax basis also must be spread over the installments. The tax basis per installment (assuming equal installments) will be:

$$\frac{B}{x'} = \frac{x(\frac{1}{2}C_p + C_s)}{x'}$$

And the after-tax value of annuity proceeds at date of retirement, assuming equal installments, is:

$$f'\left[P - t'(P - \frac{B}{x'})\right] = \frac{1 - (1+i)^{-x'}}{i}\left\{(C_p + C_s)\frac{(1+r)^x - 1}{r}\frac{r}{1-(1+r)^{-x}}\right.$$

$$\left. - t'\left[(C_p + C_s)\frac{(1+r)-1}{r}\frac{r}{1-(1+r)^{-x'}} - \frac{x(\frac{1}{2}C_p + C_s)}{x'}\right]\right\}$$

The equation for obtaining the present value of a retirement annuity now can be stated as:

$$V = F\left\{f'\left[P - t'(P - \frac{B}{x'})\right]\right\} = F\left\{f'\left[gh(C_p + C_s) - t'(gh(C_p + C_s) - \frac{B}{x'})\right]\right\}$$

$$\text{or } V = (1+i)^{-x}\left\{\frac{1-(1+i)^{-x'}}{i}\left[(C_p + C_s)\frac{(1+r)^x - 1}{r}\frac{r}{1-(1+r)^{-x'}}\right.\right.$$

$$\left.\left. - t'\left((C_p + C_s)\frac{(1+r)^x - 1}{r}\frac{r}{1-(1+r)^{-x'}} - \frac{x(\frac{1}{2}C_p + C_s)}{x'}\right)\right]\right\}$$

The example given in the previous section will be expanded by adding three more assumptions:[1]

11. Contributions are to be invested in annuities that earn 4 per cent annual return. No life insurance is included in the annuity contract.

12. The proceeds of the plan are to be received in 10 equal annual installments after retirement.

13. The marginal tax rate of the self-employed person is expected to be about 20 per cent each year after his retirement.

When the values in the example are substituted for the variables in the preceding equation for obtaining the present value of a retirement annuity, the result is:

$$V = (1+.05)^{-20}\left\{\frac{1-(1+.05)^{-10}}{.05}\left[2{,}500\frac{(1+.04)^{20}-1}{.04}\frac{.04}{1-(1+.04)^{-10}}\right.\right.$$

$$\left.\left. - .20\left(2{,}500\frac{(1+.04)^{20}-1}{.04}\frac{.04}{1-(1+.04)^{-10}} - \frac{20(\frac{1}{2})2{,}500}{10}\right)\right]\right\}$$

$$= .37689\left\{7.7217\left[2{,}500(29.778)(.12329) - .20(2{,}500(29.778)(.12329) - 2{,}500)\right]\right\}$$

$$= .37689\left\{7.7217\left[9{,}178 - .20(9{,}178 - 2{,}500)\right]\right\}$$

$$= .37689\left\{7.7217\left[9{,}178 - 1{,}336\right]\right\}$$

$$= .37689\left\{60{,}554\right\}$$

$$= 22{,}822$$

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[1]The reader is again reminded that the assumptions made in the example are not necessarily realistic. Some results obtained from various combinations of values for variables are presented in Chapter V and in Appendix B.

The present value of the annuity proceeds in this example is, therefore, $22,822. The factors for F, f', g and h were obtained directly from present value tables.[1]

Net Present Value Formula

As was stated earlier, the net present value of an investment alternative is the difference between the present value of proceeds and the present value of incremental costs. In terms of the symbols being used in this study:

$$\text{Net present value} = V - C_t$$

$$= F\left\{f'\left[gh(C_p + C_s) - t'\left(gh(C_p + C_s) - \frac{B}{x'}\right)\right]\right\}$$

$$- f\left[(C_p + C_e + C_s) - t(C_e + \tfrac{1}{2} C_p)\right]$$

$$= (1 + i)^{-x}\left\{\frac{1 - (1 + i)^{-x'}}{i}\left[(C_p + C_s)\frac{(1 + r)^x - 1}{r}\,\frac{r}{1 - (1 + r)^{-x'}}\right.\right.$$

$$\left.\left. - t'\left((C_p + C_s)\frac{(1 + r)^x - 1}{r}\,\frac{r}{1 - (1 + r)^{-x'}} - \frac{x(\frac{1}{2}C_p + C_s)}{x'}\right)\right]\right\}$$

$$- \frac{1 - (1 + i)^{-x}}{i}\left[(C_p + C_e + C_s) - t(C_e + \tfrac{1}{2}C_p)\right]$$

If the formula results in a positive answer then the H. R. 10 investment is superior to the alternative one <u>from a profitability standpoint</u>. The H. R. 10 investment is then expected to return something more than 5 per cent yield after taxes. If there are several H. R. 10 investments available as alternatives to the investment that will return 5 per cent after taxes, then the alternative with the largest net present value would appear to be the most profitable. There is, however, an implied assumption in the net present value approach that

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[1]Table 1, <u>Tables for Use in Analyzing Business Decisions</u>, Bracken and Christenson.

as funds are released they may be reinvested at a return of 5 per cent after taxes. In other words, it is assumed that an investment equivalent to the alternative one is always available.

If the formula results in a negative answer then the H. R. 10 investment is not as profitable as the alternative one. The present value of its cost exceeds the present value of its proceeds, assuming a 5 per cent "cost of capital" or alternative yield. It must be kept in mind, however, that the results evaluate only profitability, and that other considerations may outweigh the differences in expected yield.

Values for $\underline{V}$ and $\underline{C_t}$ were derived for the example used in the two preceding sections of this Chapter. Now it can be seen that:

Net present value = $V - C_t = 22,822 - 30,843 = -8,021$

Since the net present value is a negative figure, the H. R. 10 investment in the example chosen is unprofitable relative to the available alternative. The extent of the relative unprofitability in this example is the result of a number of things:

1. Unfavorable

   (a) The stated yield to the H. R. 10 investment is less, before taxes, than is the assumed alternative yield after taxes.

   (b) The after-tax cost of contributions for employees provides no proceeds to the self-employed person. Of course, it can be correctly said that this cost is a part of the overall cost of the proceeds the self-employed person does get. Caution: Assumption number 6 may be unrealistic; wages may either be lower in future years, or employee performance may be better, than would have been the case without the retirement plan.

(c) The cost outlay occurs in earlier years than those in which proceeds are received. In other words, the average present value of actual cost dollars exceeds the average present value of actual proceeds dollars, purely because of the time value of money.

2. Favorable

(a) Income taxes on some contributions, and on all yields, are deferred until after retirement. This means that the tax cost, in present value terms, is relatively small.

(b) The marginal tax rate is expected to be lower after retirement than it is before retirement. Therefore, income dollars are shifted from higher to lower tax rates.

In the example chosen, the unfavorable factors simply outweighed the favorable ones. Under certain other assumptions, the opposite result could be expected.

Rate of Return Formula

The yield (i) on an H. R. 10 investment may be approximated directly, without any assumptions about an alternative investment rate or a "cost of capital." The approach involves finding a value for i that will equate the present values of cost and proceeds for an H. R. 10 investment. To do this, the equations for obtaining the present values of cost and proceeds may be set equal to each other, the values other than i substituted in the formula, and a solution obtained for i. The formula would be:

$$(1+i)^{-x}\left\{\frac{1-(1+i)^{-x'}}{i}\left[(C_p+C_s)\frac{(1+r)^x-1}{r}\frac{r}{1-(1+r)^{-x'}}\right.\right.$$

$$\left.\left.-t'\left((C_p+C_s)\frac{(1+r)^x-1}{r}\frac{r}{1-(1+r)^{-x'}}-\frac{x(\frac{1}{2}C_p+C_s)}{x'}\right)\right]\right\}$$

$$=\frac{1-(1+i)^{-x}}{i}\left[(C_p+C_e+C_s)-t(C_e+\tfrac{1}{2}C_p)\right]$$

A straightforward mathematical solution of this formula for i would be very complex. A solution by means of a series of approximations is possible, but would be quite tedious in this case--due to the presence of i in three different present value factors. When the formula is programmed and submitted to a high-speed computer, however, a solution can be readily obtained for i by a process of iteration. This process is simply one in which the computer tries successively increasing (or decreasing) values for i until an approximate equality between the two sides of the formula is obtained.

When the values in the example used in the preceding two sections of this chapter are substituted in the foregoing formula for all variables except i, the formula appears as:

$$(1+i)^{-20}\left\{\frac{1-(1+i)^{-10}}{i}\left[2{,}500\frac{(1+.04)^{20}-1}{.04}\cdot\frac{.04}{1-(1+.04)^{-10}}\right.\right.$$

$$\left.\left.-.20\left(2{,}500\frac{(1+.04)^{20}-1}{.04}\cdot\frac{.04}{1-(1+.04)^{-10}}-\frac{20\left(\frac{1}{2}\right)2{,}500}{10}\right)\right]\right\}$$

$$=\frac{1-(1+i)^{-20}}{i}\left[(2{,}500+500)-.30\left(500+\frac{2{,}500}{2}\right)\right]$$

An iteration program for the formula was prepared and run on a computer, using the values as given.[1] The approximate rate of return (after Federal income taxes) under the circumstances assumed is 3.03 per cent.

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[1]The program for the basic formula, in FORTRAN 60 language, is reproduced in Appendix A, Exhibit 3. This program was written with help from Stanley T. Hardy, Doctoral Candidate, Department of Management, Michigan State University.

CHAPTER V

QUANTITATIVE EVALUATION OF H. R. 10 PLANS

H. R. 10 Plans Reduced to Rates of Return

Both the net present value and rate of return techniques were adapted in Chapter IV to the evaluation of H. R. 10 plans. The rate of return approach is used in the quantitative analysis in this study in order to avoid questions about "cost of capital" and assumptions about alternative yields that may be available. Rates of return are indices of relative profitability, subject of course to the validity of any assumptions that must be made in each case being evaluated.

The computer program presented in Exhibit 3 of Appendix A will help in quantitatively evaluating H. R. 10 investment alternatives whenever access to a computer is available. That program is a version of the rate of return formula that was derived in the preceding chapter. It finds and prints the approximate rate of return that equates the present values of costs and proceeds for a particular set of circumstances. As was suggested in Chapter IV,[1] some situations will require other arrangements of the formula and of the computer program for that formula.

Exhibit 4 of Appendix A is a program that will solve for, and print, a series of after-tax rates of return (i) as the value of the stated return (r) is systematically increased, and while the values for all other independent variables are held constant. Exhibits 5 through

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[1] See pages 69-70.

11 are programs that obtain similar solutions for variations of each of the other independent variables.

The computer programs in Appendix A, and other variations of these programs, were used to derive the rates of return that are presented in the tables of Appendix B. The tables represent only a small sample of the tremendous number of possible combinations of values for variables; in spite of the large number of possible combinations, they should still be useful to persons considering H. R. 10 plans. More extensive tables should be prepared as soon as Congressional action on proposed amendments to H. R. 10 has been taken.[1]

Trends

Table 1, Appendix B, shows the solutions for i (the after tax rate of return) to be positively related to the values assigned to r (the stated rate). Also, i can generally be expected to be somewhat less than r, although in Case VII i exceeds r when r assumes values less than 4.75 per cent. It seems that r is the most dominating variable in determining i. The slope of the lines in Figure 1 of this chapter indicates a strong relationship between r and i at all points for the case (Case II of Exhibit 13, Appendix B) pictured there. It appears from Table 1 that a similar relationship exists for the other cases examined.

One surprising observation is that the after-tax rate of return (i) increases as the marginal tax rate before retirement (t) increases. This fact is apparent from the data contained in Table 2 of Appendix B, and in Figure 2 of this chapter. The reason for the positive relation-

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[1]See page 40.

ship between t and i becomes apparent when one is reminded that contributions are being evaluated on an incremental basis. Current savings in taxes reduce the current cost of contributions. The present value of future tax payments is always less than current payments, unless marginal tax rates are expected to be substantially higher in the future than they are now.

The relationship between i and t' (the marginal tax rate after retirement) is inverse for all cases examined in Table 3 of Appendix B. As the marginal tax rate after retirement is increased, the net proceeds after taxes must decrease. This means that a lower rate of return (i) is required to equate the present value of diminished proceeds with the present value of given amounts of cost. The most favorable situation is when t' is expected to be zero. The fact that a retired person may have substantially reduced income, and be permitted larger exemptions, deductions, and tax credits, makes such an assumption entirely valid in some circumstances.

The relationship between i and C_p (annual basic contributions for the self-employed person) is strongly positive, as is shown by Table 4 and Figure 4. The relationship is much stronger at lower values for C_p than for higher values, as long as C_e (annual contributions for employees) is greater than zero. When C_e and C_s (supplemental contributions by the self-employed person) are both zero, however, changes in the value of C_p have no influence on i. This situation is presented as Case VII in Table 4.

Changes in the amount of supplemental contributions (C_s) by the self-employed person have a relatively minor effect on the rate of return in most of the cases studied. This fact is apparent from the data in

Table 5, Appendix B. In two of the cases, VII and XI, the relationship between C_s and i is actually slightly negative. This does not necessarily mean, however, that supplementary contributions should not be made in these cases. The rate of return indicated is on all contributions to the plan, including supplemental contributions, and if it is sufficiently attractive, relative to other alternatives available, then the self-employed person likely will want to contribute as much as possible.

In Table 6 and Figure 6, i and C_e are inversely related for any given set of circumstances. This is predictable since additional contributions for employees increase costs without any corresponding increase in proceeds to the self-employed person. C_e has a stronger relative effect on i when r is lower, and when contributions in behalf of the self-employed person are lower, than when these variables assume higher values.

In Tables 7 and 8 and in Figures 7 and 8, rate of return (i) varies directly with the values assigned to x (number of years until retirement) and x' (number of years after retirement that an annuity is to run) for all cases examined except Case VII. In this case i actually exceeds r when the years over which the investment is spread are few, and i decreases as the investment period is extended. In each of the other cases, i is initially somewhat less than r, and tends to approach the value of r as x and x' are increased.

In summary, the after-tax rate of return (i) is always positively related to the independent variables r, C_p, and t. It is always negatively related to C_e and t'. Generally, i is positively related to the

variables $\underline{x}$, $\underline{x}'$, and $\underline{C_s}$. An exception to the latter observation was noted for Case VII, as $\underline{i}$ relates to $\underline{x}$ and $\underline{x}'$; and for Cases VII and XI, as $\underline{i}$ relates to $\underline{C_s}$.

Limits

No one positive rate of return can be stated that would suffice as a minimum for all taxpayers. On the other hand, any combination of circumstances that results in a negative return is probably unacceptable. Money can be held in its pure form at a zero return.

Although no minimum positive return can be set for all individuals, each person should be able to determine his own minimum acceptable return. This minimum will likely be the after-tax return that is available on an investment that is comparable, or better, in terms of benefits and risk. For example, if an individual can expect always to be able to invest in insured savings accounts at a 3 per cent return before taxes, and if his marginal tax rate is expected to be about 30 per cent, he might say that 2.1 per cent (70 per cent of 3 per cent) is the minimum return he would accept on other investments. Since the maximum Federal income tax rate is presently 70 per cent (Caution: State and local income taxes may also be applicable), it would appear that no taxpayer should be willing to accept less than 0.9 per cent return (30 per cent of 3 per cent) after taxes as long as 3 per cent is available on insured savings. Even in this example, however, the generalization may not hold because of elements of life insurance, guaranteed returns, or other features often included in pension plan participation. Each potential participant must assess the value of any such features in arriving at the minimum return he is willing to accept on investments in that particular plan.

Contributions for Employees

It has been assumed, for simplicity, that contributions for employees (C_e) provide no benefits to the employer other than to permit him to participate in an H. R. 10 plan. Under this assumption, the after-tax cost of contributions for employees simply increases the cost to the employer of obtaining his own retirement benefits.

H. R. 10 does not permit a reduction in employee wages at the time a plan is instituted. It may be likely, however, that either lower wages or better employee performance can be expected in future periods as a result of having the plan. If this is the case, only the portion of contributions for employees that is not expected to yield benefits to the business should be included as a cost (C_e) of obtaining retirement benefits for the employer.

Changes in Purchasing Power

Another assumption has been that no inflation (or deflation) is expected during any of the periods in which contributions are made or proceeds are received. This assumption may be acceptable as long as no other assumption is more likely, or because changes in purchasing power are expected to be immaterial in effect.

No attempt was made to introduce purchasing power changes as a variable in the rate of return formulae. This is suggested as an important project for future research, not only in connection with H. R. 10 investments, but for evaluating all kinds of investments. Some allowance can be made for expected changes in purchasing power by adjusting the value assigned to r in the computer programs. For example, if inflation is expected at a rate of 1 per cent per year, the value for

r should be reduced by at least 1 per cent, and perhaps more to allow also for the inflationary effect on the purchasing power of principal contributions. This procedure would result in a lower rate of return (i) that should more closely approximate the "real" return on the investment.

Other Reservations

State and local income taxes have been ignored in this analysis. Where they apply, they must be worked into the formulae and into computer programs.

Administrative charges by trustees, banks, and other administrators have also been neglected. Such charges vary widely for the various plans that are available. Fixed dollar charges can be accommodated by increasing contributions by the amount of the charges. Percentage investment management fees can be allowed for by reducing the stated rate (r) by an appropriate margin.

Selecting an H. R. 10 Plan

A number of variables help to determine the rate of return that is achieved on H. R. 10 investments. A self-employed person has less control over some of these variables than he has over others. It is likely that the marginal tax rates (t and t') will be largely determined by other factors, although the shifting of taxable income, and changes in the nature of income, by means of a pension plan undoubtedly has some effect on the marginal rates. Since all taxable proceeds from any H. R. 10 plan are taxed as ordinary income, the variables t and t' will probably not be determining factors in choosing a particular type

of H. R. 10 plan. The statement can be made, however, that the higher the marginal tax rates are before retirement, and the lower the marginal tax rates are after retirement, the more attractive will be H. R. 10 plans in general. Conversely, the lower t is, and the higher t' is, the less attractive are H. R. 10 plans. These observations are borne out by the results in Tables 2 and 3 of Appendix B and, for one case, by Figures 2 and 3 of this Chapter.

A self-employed person who is considering an H. R. 10 plan will also have relatively little control over the amount he must contribute for his employees. The value for C_e (contributions for employees) will depend mostly on the number of permanent employees he has, and on the level of their earnings. No matter what type of plan he chooses, the self-employed person will be likely to contribute the amount for his employees that will assure maximum contributions for himself. He will minimize C_e to the extent that he can without reducing his own contributions (C_p). The observation was made earlier in this Chapter that H. R. 10 plans in general become less attractive as the potential level of C_e increases. This relationship is shown in Table 6, Appendix B and, for one case, in Figure 6.

A plan would normally be selected that permits the maximum basic and supplemental contributions (C_p and C_s) for the self-employed person. At any point where an H. R. 10 plan becomes attractive for a certain level of C_p, it should be even more attractive at a higher level of C_p. A similar statement will usually hold for the level of C_s. Cases VII and XI in Table 5, Appendix B, are possible exceptions to this statement. Even here, however, increases in C_s reduce the rate of return (i) relatively little, and the overall return to the total investment may still

make the additional contributions desirable.

In most situations it would appear desirable to make the "build-up" (x) period until retirement as long as possible. The rate of return (i) increases as x increases for all cases in Table 7, Appendix B, except Case VII. In that case, circumstances are such that i exceeds r (the stated rate) by decreasing margins as x increases to 22 years, and is less than r by increasing margins as x increases beyond 22 years. Even here, however, the increase in the absolute size of *total* returns over a greater number of years may more than offset the decrease in earning *rate*, depending on the availability of other attractive investment opportunities.

The rate of return (i) also increases as x' (number of years after retirement) increases for all cases in Table 8, Appendix B, except Case VII. In this Case, again, i decreases slightly as x' is increased. If another more attractive investment is not available, however, an investor may prefer to receive a *slightly lower* after-tax return over a *longer* period of years. At any rate, it would seem that an individual would usually want to spread his benefits over a relatively long period of time—perhaps over his expected life, or over his lifetime by means of a life annuity. Another point is that the lowest marginal tax rate (t') will probably result when x' is longest. For the cases in Appendix B, t' is simply selected arbitrarily, and is held constant for all variations except in Table 3, when t' itself is varied. In fact, however, the level of t' will depend, at least partly, on the amount of yearly proceeds from the pension plan after retirement.

The after-tax rate of return (*i*) follows very closely the level of the before-tax return (*r*). Other things equal, the plan offering the highest return before taxes (*r*) will be the most attractive. Differences in risk, guarantee features, and life insurance elements cannot be ignored, of course. An individual might prefer a low rate of return that is relatively certain to an estimated high return that may never materialize. Guaranteed return of principal contributions, and sum certain and years certain features can be expected to carry with them lower rates of return. Each individual must determine for himself the value of such features, in terms of how much he will accept as a lower rate of return.

Case III, in Tables 2 through 8 of Appendix B, is intended to represent a possible plan using United States Retirement Plan Bonds. When *r* is held at 3 3/4 per cent, and the values for other independent variables are varied, the results (*i*) of a bond plan under a number of different circumstances can be observed.

H. R. 10 Plans Compared to Corporate Plans

A general comparison of the tax treatment accorded H. R. 10 and regular employee plans was made in Chapter III.[1] It was apparent from that comparison that self-employed persons have not yet been permitted benefits equivalent to those accorded corporate employees--and in particular, to the benefits accorded their stockholder-employee counterparts.[2]

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[1]See page 33.

[2]See footnote 2, page 1, about the stated purpose of the H. R. 10 Act.

The comparison in Chapter III does not measure the extent of the effect of differences in tax treatment in quantitative terms. One way of showing this effect is by simulating the expected returns under each of the situations being compared. A quantification has been made of the effect of one of the differences in tax treatment--where the tax deductions by a self-employed individual is limited to 50 per cent of his basic contributions for himself--for Cases I and II in Appendix B. It must be emphasized, however, that other differences in treatment, such as possible differences in values assigned to the variables themselves (possible lower contributions for corporate employees, for instance), have not been quantified. These differences could be allowed for in any actual comparison by assigning the different expected values to variables in each of the programs being used.

Changes were made in the rate of return formula derived in Chapter IV to adapt it for evaluating contributions to a corporate plan by a stockholder-employee. The same symbols are used as were identified in Chapter IV.[1] The words "self-employed person" should be replaced by "stockholder-employee" wherever they occur in the identification of symbols.

The tax elements of the rate of return formula must reflect full deductibility of basic contributions by a stockholder-employee. The amended formula is:

$$(1+i)^{-x}\left\{\frac{1-(1+i)^{-x'}}{i}\left[(C_p+C_s)\frac{(1+r)^x-1}{r}\,\frac{r}{1-(1+r)^{-x'}}\right.\right.$$

$$\left.\left.-\,t'\left((C_p+C_s)\frac{(1+r)^x-1}{r}\,\frac{r}{1-(1+r)^{-x'}}-\frac{xC_s}{x'}\right)\right]\right\}$$

---

[1] See page 67.

$$= \frac{1 - (1 + i)^{-x}}{i} \left[(C_p + C_e + C_s) - t(C_e + C_p) \right]$$

The computer program in Exhibit 12, Appendix A, was adapted from the foregoing formula. Variations of that program were used to obtain the results shown in the Tables under Cases Ib and IIb in Appendix B.

Figures 1 through 8 were prepared in order to show a visual picture of the difference in tax treatment as independent variables are varied. They reflect the rates of return (i) presented as Cases IIa and IIb in the Tables in Appendix B. The points were plotted on arithmetic scales and joined with lines. It is again emphasized that the only difference in tax treatment being evaluated here is the 50 per cent restriction on deductions for contributions in their own behalf by self-employed persons. Also, only two basic cases (I and II) are analyzed in this way in the Tables of Appendix B, and only one basic case (II) is presented in the Figures in this Chapter.

The figures show that the rate of return (i) to a stockholder-employee exceeds the return to a self-employed person in all situations examined except where the marginal tax rate after retirement (t') is assigned values above 50 per cent. In Case I, Table 3, Appendix B, the H. R. 10 plan becomes more attractive when t' exceeds 39 per cent. Under the remaining circumstances the Tables indicate that somewhat the same relationships exist for Case I as for Case II.

Under any reasonable circumstances, an individual would be better off participating in a corporate retirement plan as a stockholder-employee than as a self-employed participant in an H. R. 10 plan. The foregoing observation does not, however, take into consideration the non-pension considerations involved in choosing a form of business

FIGURE 1

After-Tax Rates of Return to A Self-Employed Person and to A Stockholder-Employee Participating in Pension Plans under Similar Circumstances (Case IIa and IIb) As r Is Varied
(r = annual return to pension plan investments)

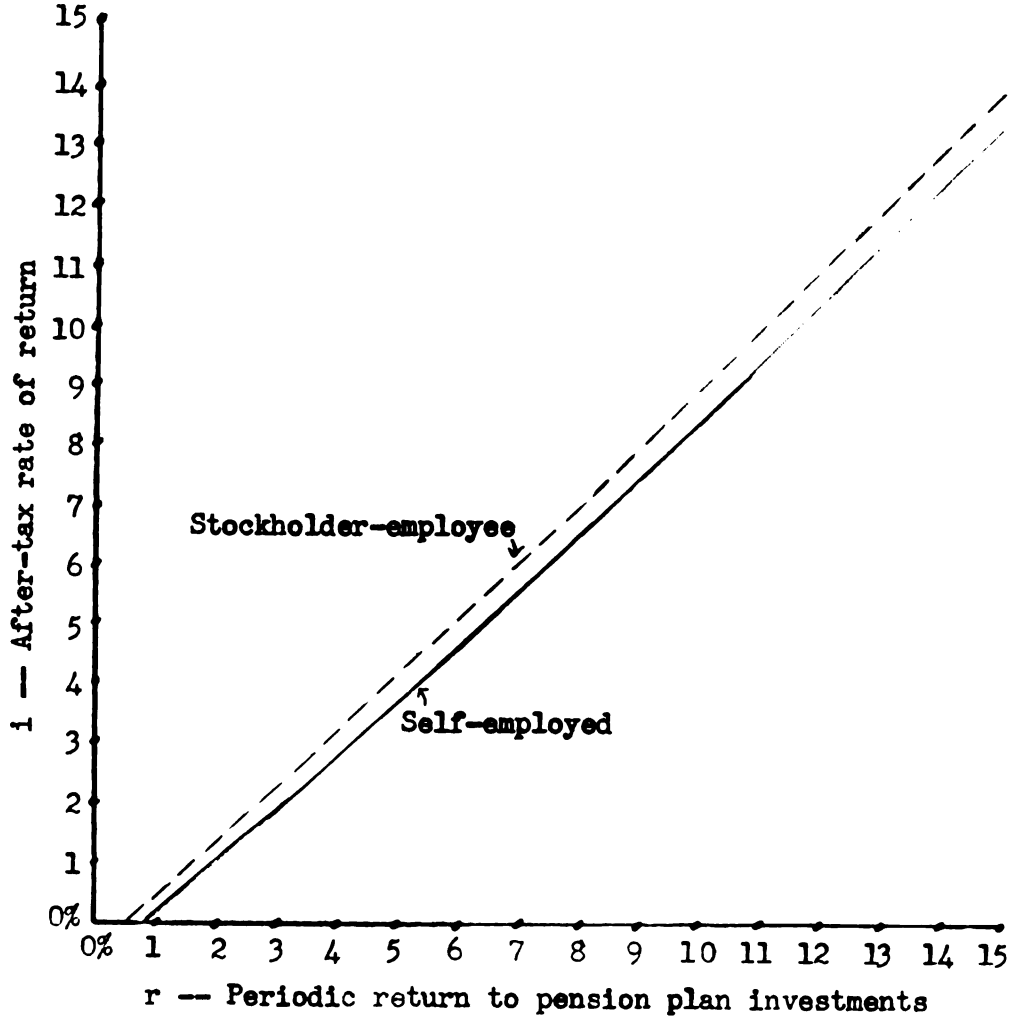


FIGURE 2

After-Tax Rates of Return to A Self-Employed Person and to A Stockholder-Employee Participating in Pension Plans under Similar Circumstances (Case IIa and IIb) As t Is Varied (t = marginal tax rate before retirement)

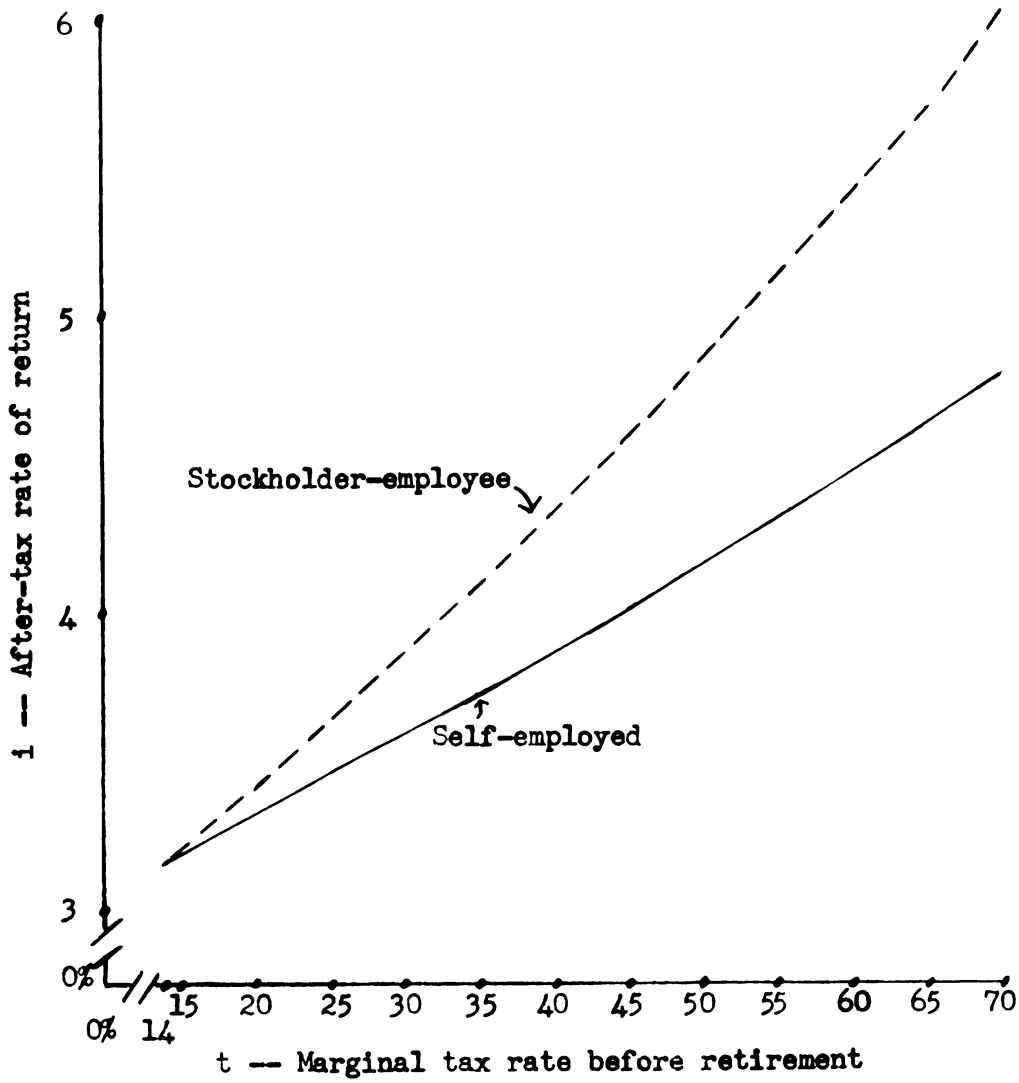


FIGURE 3

After-Tax Rates of Return to A Self-Employed Person and to A Stockholder-Employee Participating in Pension Plans under Similar Circumstances (Case IIa and IIb) As t' Is Varied
(t' = marginal tax rate after retirement)

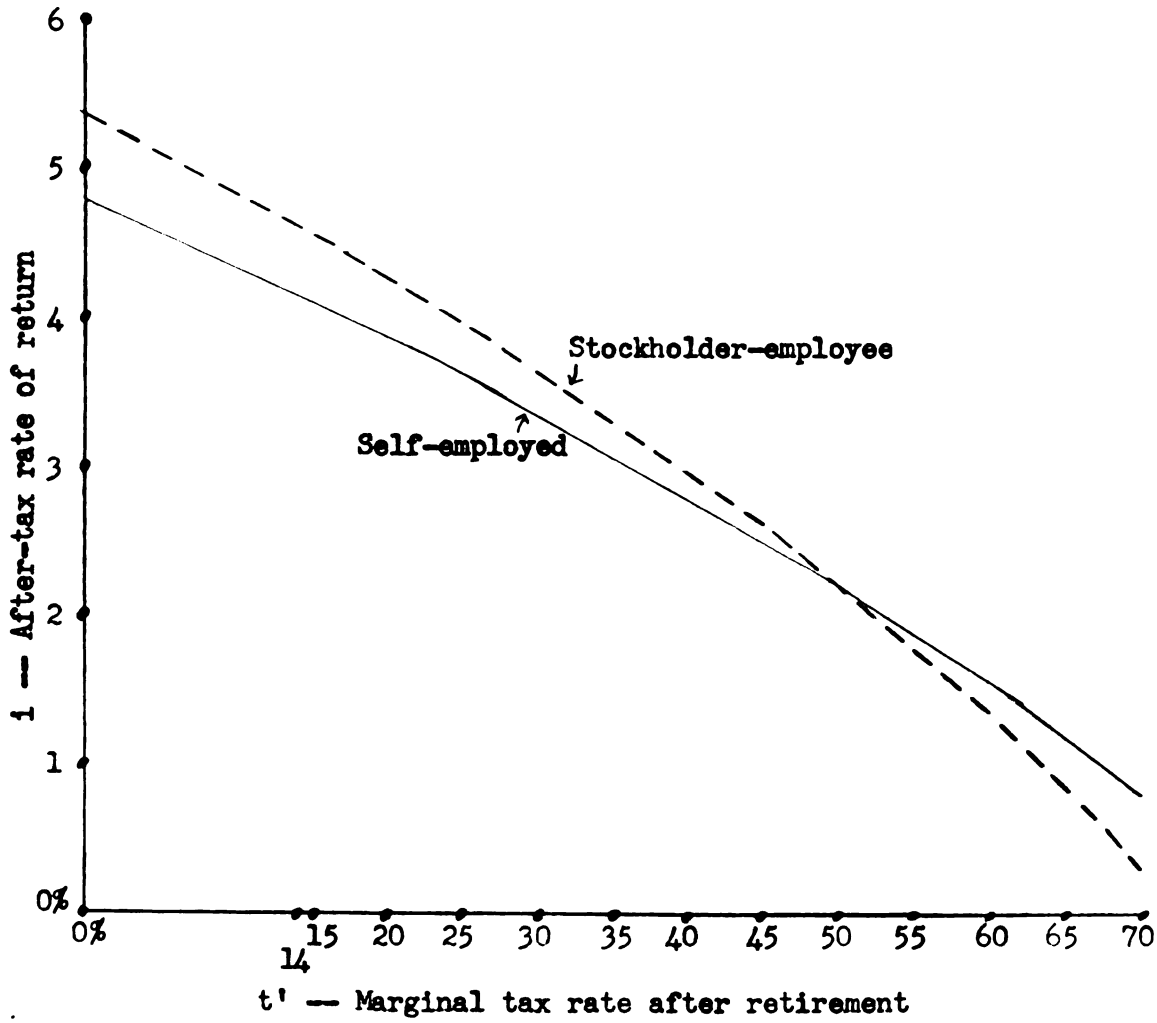


FIGURE 5

After-Tax Rates of Return to A Self-Employed Person and to A Stockholder-Employee Participating in Pension Plans under Similar Circumstances (Case IIa and IIb) As C_S Is Varied

(C_S = annual supplementary contributions by "self-employed" person)

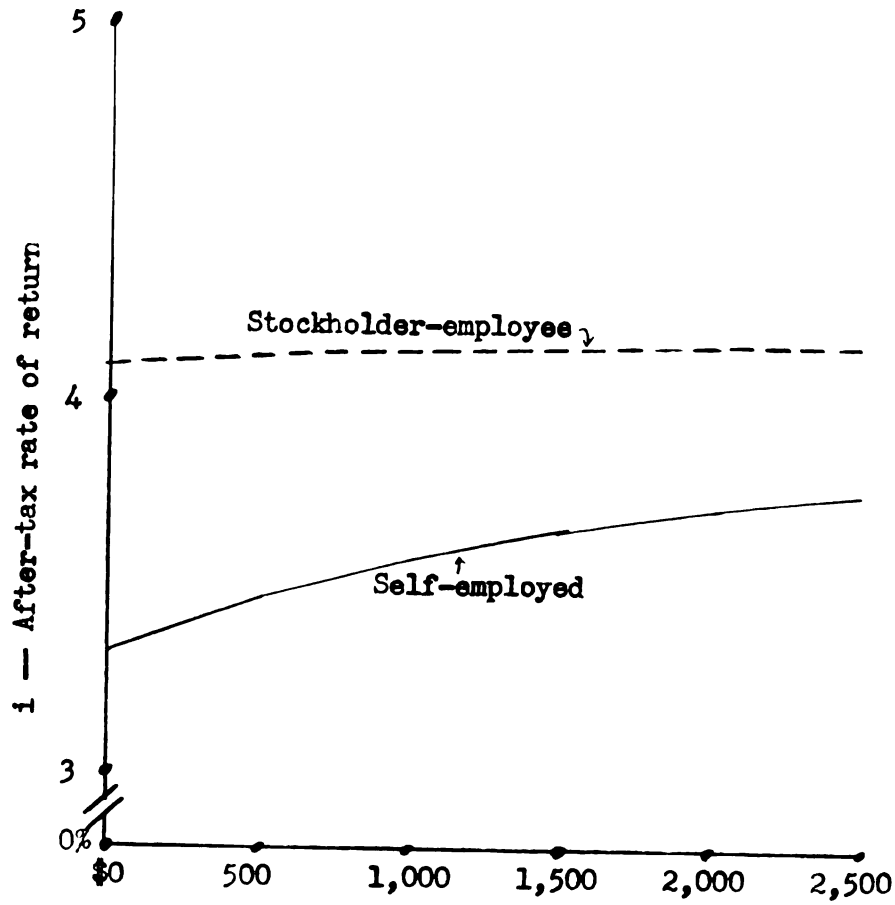


FIGURE 6

After-Tax Rates of Return to A Self-Employed Person and to A Stockholder-Employee Participating in Pension Plans under Similar Circumstances (Case IIa and IIb) As C_e Is Varied
(C_e = annual contributions for employees)

FIGURE 7

After-Tax Rates of Return to A Self-Employed Person and to A Stockholder-Employee Participating in Pension Plans under Similar Circumstances (Case IIa and IIb) As x Is Varied (x = number of years until retirement)

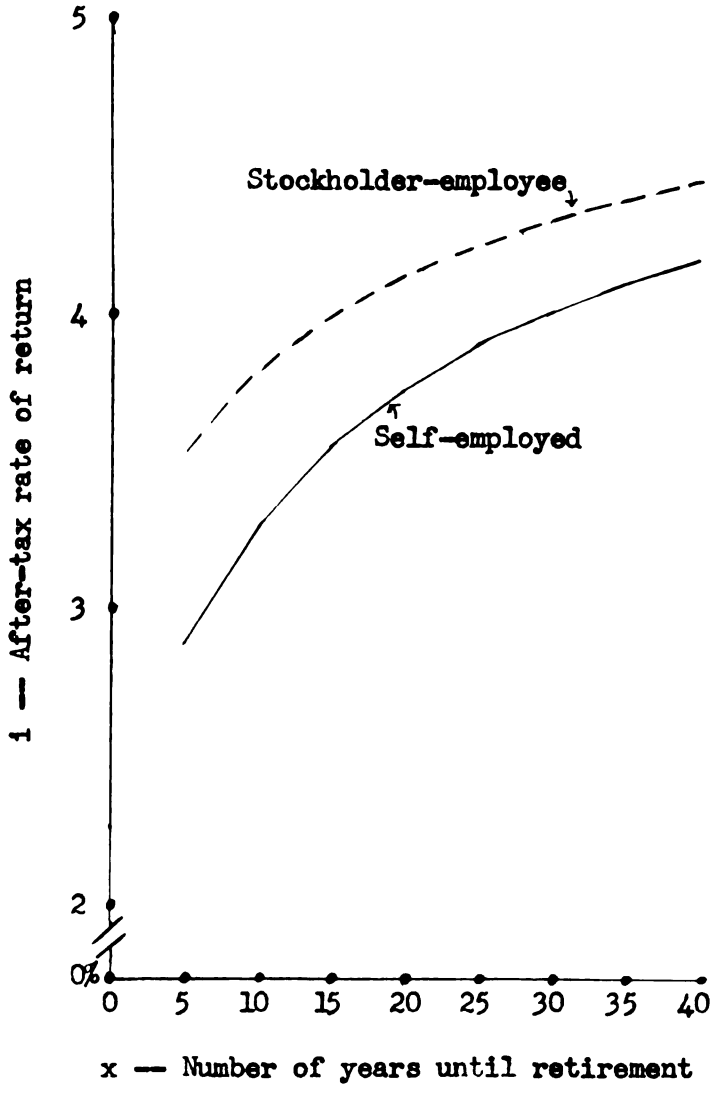
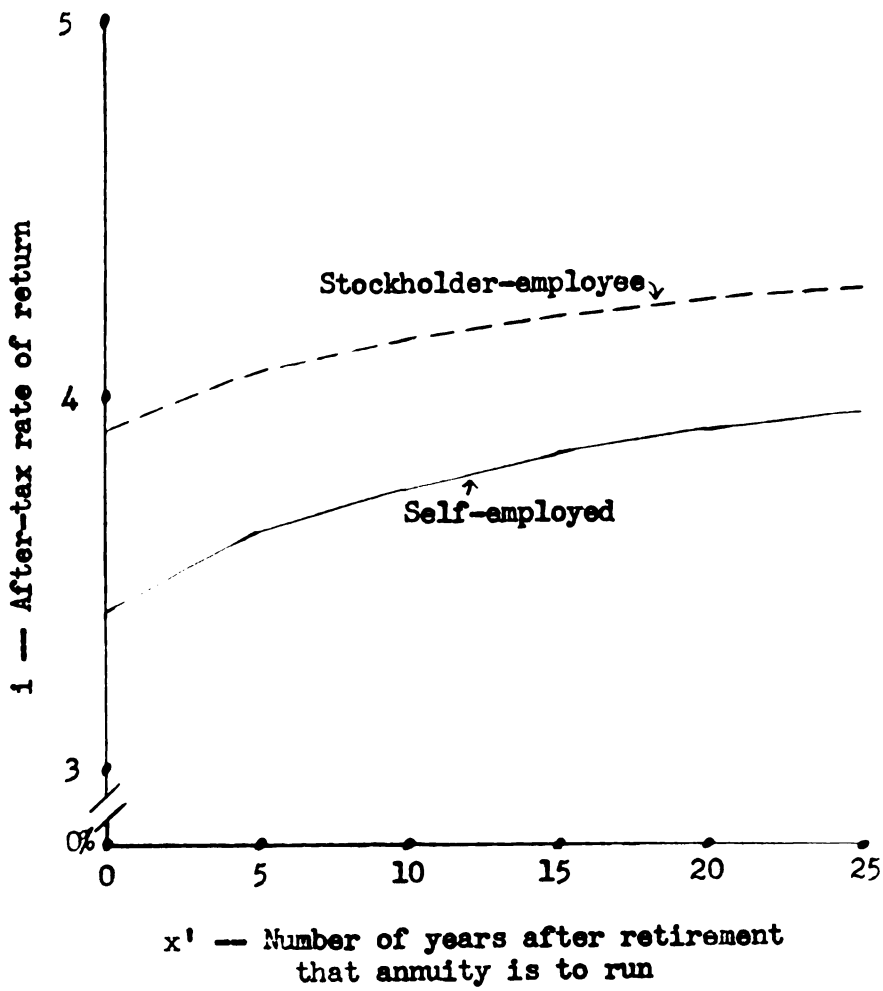


FIGURE 8

After-Tax Rates of Return to A Self-Employed Person and to A Stockholder-Employee Participating in Pension Plans under Similar Circumstances (Case IIa and IIb) As x' Is Varied
(x' = number of years after retirement that annuity is to run)



operation. Other income tax considerations, corporate franchise and stock taxes, or the legal cost of incorporating and operating as a corporation may more than offset the benefits of a corporate pension plan. In addition, as was pointed out in Chapter II, the corporate form of operation may not be available to professional persons.[1]

When Is an H. R. 10 Plan a Good Investment?

The more important provisions of H. R. 10 were stated and compared in Chapter III to the tax treatment accorded regular employee plans. In the preceding sections of this Chapter, and in Appendix B, representative H. R. 10 plans have been analyzed from the standpoint of their after-tax rates of return.

Even after an H. R. 10 plan is selected by a self-employed individual, there still remains the decision of whether an H. R. 10 plan should be used at all. Very few self-employed persons have instituted H. R. 10 plans.[2] Those not participating in H. R. 10 plans either have not considered them or have considered and rejected them as a form of investment. Those who have rejected the use of H. R. 10 plans may have done so either after a sound or an unsound analysis, but it is a fact that H. R. 10 plans are not inherently good investments for all self-employed persons.

The following observation would appear to be sound purely from a rate of return standpoint: An H. R. 10 plan is an attractive investment only when its after-tax rate of return (i) exceeds the after-tax rate available on other investment opportunities. The

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[1]See page 21. [2]See page 4.

periods of evaluation must, of course, be comparable for all potential investments under consideration. In other words, if a reasonably sure return (before tax) of 6 per cent can be derived from another investment throughout the years both before and after retirement, and if the taxpayer's marginal tax bracket is expected to be about 40 per cent during all years, then an H. R. 10 plan should return better than 3.6 per cent after tax in order to be a more attractive investment. Once again, it must be stressed that all factors should be taken into consideration in the decision-making process. Any capital gains available from alternatives will tend to make those alternatives more attractive. A capital gain is taxed at a lower rate than is ordinary income under the same circumstances; capital gain treatment is expressly denied for proceeds from H. R. 10 plans.[1] Non-quantifiable considerations, such as loss of access to committed funds,[2] should also be carefully weighed by the person making the decision to invest.

In spite of the rather serious shortcomings of the H. R. 10 law when it is compared to regular employee benefits,[3] investments in H. R. 10 plans may still be attractive under the right combination of circumstances. Consider, for example, Case V and its performance in Table 6 as contributions for employees (C_e) are increased. Even when C_e is given a value of $5,000, there is still an after-tax return of 2.72 per cent on investments in the plan. If the best comparable alternative investment would also yield 5 per cent (ordinary income)

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[1]See page 32 . [2]See page 32 .

[3]These shortcomings were noted in the section of Chapter III starting on page 33.

before tax, there would only be 2 per cent return per year left after taxes (assuming that the marginal tax rate does not rise as a result of increased current income) during years prior to retirement. True, the after-tax return per year <u>after</u> retirement would be 3.9 per cent for this case, but the effect of lower returns in years near to the present will have a much greater influence in determining an overall return than will the present value of greater returns far in the future.

There are other favorable examples that could be cited from the Tables in Appendix B. For instance, the return (i) for Case VI at a 5 per cent value for r would probably be equivalent to the after-tax return of an investment yielding ordinary income of almost twice as much before tax.[1] If mutual fund shares that average an overall return (r) of 10 per cent before personal income taxes were employed, the after-tax yields (i) for the cases presented in Table 1 would range from 8.18 to 9.68 per cent. It is true that some of the gains that are realized on many investments qualify for capital gain treatment whereas such treatment is denied for proceeds from H. R. 10 plans.[2] Still, differences between tax treatments far in the future may have relatively little effect in present value terms. A dollar of tax payment due in 20 years is valued at approximately 21 cents now if an interest rate of 8 per cent is assumed; at the same rate, a dollar due in 30 years is valued at approximately 10 cents currently.

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[1]Table 1, Appendix B.

[2]See page 32.

H. R. 10 investments could be better compared to other investment alternatives if tables similar to those in Appendix B were available for other investments as well. The derivation of formulae and programs for the analysis and comparison of all types of investments under varying conditions is suggested as an area worthy of research.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Based on the discussion and analysis in the preceding Chapters, the following conclusions are drawn:

1. H. R. 10 did not provide pension tax benefits to self-employed persons comparable to those accorded regular employees under traditional plans.

2. Investments in pension plans are capable of being evaluated in present value terms by means of so-called capital budgeting techniques.

3. Participation in a pension plan as a stockholder-employee will almost always provide a higher rate of return than participation under the same circumstances in an H. R. 10 plan as a self-employed person.

4. After-tax returns to investments in H. R. 10 plans, in spite of the shortcomings attributed to the Act, compare quite favorably in many cases to after-tax returns available on non-pension types of investments.

5. The after-tax rate of return to H. R. 10 investments by a self-employed person is positively related to the before-tax rate of return achieved, the amount of basic contributions made by him, and the level of his marginal tax bracket during the years prior to his retirement. It is negatively related to the amount of contributions made for his employees, and to the level of his marginal tax bracket after retirement. Under most circumstances observed, the after-tax rate of return is positively related to the length of the period of participation prior to retirement, to the number of years after retirement over which proceeds are received, and to the amount of supplemental contributions made by the self-employed person.

Recommendations

As a result of the discussion, analysis, and conclusions, the following recommendations are made:

1. The inequity existing between pension tax benefits provided for self-employed persons and those provided for stockholder-employees should be removed through legislation. The amendments currently under consideration in Congress would largely remove the inequities. The proposed amendments would remove the 50 per cent limit on deductibility of basic contributions by a self-employed person, remove the 10 per cent or $2,500 limit on basic contributions by self-employed persons who have common-law employees, liberalise the present definition of "earned income" where capital investment is material, and give tax recognition to "professional corporations" permitted by State law.

2. Self-employed persons should consider the merits of investing in H. R. 10 plans, whether or not the proposed amendments to liberalize the law are enacted.

3. H. R. 10 investment opportunities, and other potential investments as well, should be quantitatively evaluated in terms of rates of return or net present values. The results of the quantitative analysis ought to be considered along with non-quantifiable factors in arriving at a decision of whether or not to invest in the alternative under consideration.

4. More complete tables showing results of simulations by computer of investment results should be compiled whenever legislative action (either pro or con) on the proposed amendments to H. R. 10 is taken. Such tables should prove most useful to persons who are considering the adoption of an H. R. 10 plan.

5. The framework developed in this study for H. R. 10 investment analysis should be adapted to simulations and comparisons of returns to other kinds of investments.

6. Research should be undertaken in an attempt to introduce future changes in purchasing power as a variable in formulae for evaluating investments.

APPENDIX A

COMPUTER PROGRAMS

The computer programs reproduced in this Appendix were written in "FORTRAN 60" lanquage for use on the "Control Data 3600" computer at Michigan State University.[1] The programs are versions of the rate of return formula presented in Chapter IV of this study.[2] Some of the variables identified in Chapter IV appear in the programs as follows:

$x = X$

$x' = XP$

$i = Y$

$r = R$

$t = T$

$t' = TP$

$C_p = CP$

$C_e = CE$

$C_s = CS$

The basic program presented in Exhibit 3 will compute the after-tax rate of return ($\underline{i}$), given values for the other variables (listed above), on investments by a self-employed person in an H. R. 10 plan. The values assigned to the variables in the programs are those assumed for the illustrative example in Chapter IV, and these same values

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[1]Much credit is due to Stanley T. Hardy, Doctoral Candidate, Department of Management, Michigan State University. Mr. Hardy translated the basic formula into an early version of the programs used in this study.

[2]See page 78.

constitute "Case I" in Appendix B. To determine the rate of return for a different set of circumstances, simply substitute the appropriate values for the independent variables in the program.

Exhibits 4 through 11 are the programs used to derive the rates of return presented under "Case Ia" in the tables in Appendix B. The same programs were used to derive the rates of return under Case IIa and Cases III through XI in the tables--the appropriate sets of values were simply assigned to the variables in each Case.

Exhibit 12 is one of the programs used to obtain rates of return on investments by a stockholder-employee in a corporate retirement plan. Only the program for varying values for r under Case Ib is presented. The programs for the remaining solutions for Ib can be obtained by substituting the equations for G and EQ2 into the programs in Exhibits 4 through 11.

EXHIBIT 3 — APPENDIX A

BASIC COMPUTER PROGRAM FOR DETERMINING THE RATE OF RETURN ON INVESTMENTS BY A SELF-EMPLOYED PERSON IN AN H.R.10 PLAN[1]

```
*  460233 DUPREE  BASIC PROGRAM                          3
       PROGRAM BEGIN
        PRINT 100
   100  FORMAT(1HO,40H RATE OF RETURN)
        X=20.
        XP=10.
        CP=2500.
        CE=500.
        CS=0.
        R=.04
        T=.30
        TP=.20
        Y=.0001
        A=1.+Y
        B=1.+R
        C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
        F=A**(-X)
        E=(1.-A**(-XP))/Y
        G=X*(.5*CP+CS)/XP
        W=(1.-A**(-X))/Y
        EQ1=F*E*(C-TP*(C-G))
        EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
        Z=EQ2-EQ1
        DO 1 I=1,10000
        Y=I
        Y=Y/10000.
        IF(Z)21,20,20
    20  Y=-Y
    21  CONTINUE
        A=1.+Y
        B=1.+R
        C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
        F=A**(-X)
        E=(1.-A**(-XP))/Y
        G=X*(.5*CP+CS)/XP
        W=(1.-A**(-X))/Y
        EQ1=F*E*(C-TP*(C-G))
        EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
        Q=EQ2-EQ1
   102  FORMAT(1HO,3F15.5)
        IF(Z)11,10,10
    10  IF(Q)3,2,1
    11  IF(Q)1,2,3
     3  Y=Y-.0001
        GO TO 2
```

EXHIBIT 3 (Continued)

```
    1  CONTINUE
    2  PRINT 101.Y
  101  FORMAT(1HO,F10.4)
       STOP
      END
      END
```

---

[1]The values assigned to variables in this case are those assumed for the illustrative example presented in Chapter IV.

EXHIBIT 4 — APPENDIX A

COMPUTER PROGRAM FOR CASE Ia — VARYING VALUES FOR R

```
* 460233 DUPREE  HR R                                          3
      PROGRAM BEGIN
       PRINT 100
  100  FORMAT(1HO.40H RATE OF RETURN)
       DO 2 JR=25,2000,25
       RJ=JR
       R=RJ/10000.
       CP=2500.
       X=20.
       XP=10.
       CE=500.
       CS=0.
       T=.30
       TP=.20
       Y=.0001
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Z=EQ2-EQ1
       DO 1 I=1,10000
       Y=I
       Y=Y/10000.
       IF(Z)21,20,20
   20  Y=-Y
   21  CONTINUE
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Q=EQ2-EQ1
  102  FORMAT(1HO,3F15.5)
       IF(Z)11,10,10
   10  IF(Q)3,2,1
   11  IF(Q)1,2,3
    3  Y=Y-.0001
       GO TO 2
```

EXHIBIT 4(Continued)

```
  1  CONTINUE
  2  PRINT 101,JR,Y
101  FORMAT(1HO,I5,F10.4)
     STOP
    END
    END
```

EXHIBIT 5 — APPENDIX A

COMPUTER PROGRAM FOR CASE Ia — VARYING VALUES FOR T

```
* 460233 DUPREE  HR T                                          3
      PROGRAM BEGIN
       PRINT 100
  100  FORMAT(1HO,40H RATE OF RETURN)
       DO 2 JT=14,70,1
       TJ=JT
       T=TJ/100.
       CP=2500.
       X=20.
       XP=10.
       CE=500.
       CS=0.
       R=.04
       TP=.20
       Y=.0001
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Z=EQ2-EQ1
       DO 1 I=1,10000
       Y=I
       Y=Y/10000.
       IF(Z)21,20,20
   20  Y=-Y
   21  CONTINUE
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Q=EQ2-EQ1
  102  FORMAT(1HO,3F15.5)
       IF(Z)11,10,10
   10  IF(Q)3,2,1
   11  IF(Q)1,2,3
```

EXHIBIT 5 (Continued)

```
  3  Y=Y-.0001
     GO TO 2
  1  CONTINUE
  2  PRINT 101,JT,Y
101  FORMAT(1HO,I5,F10.4)
     STOP
     END
     END
```

EXHIBIT 6 — APPENDIX A

COMPUTER PROGRAM FOR CASE Ia — VARYING VALUES FOR TP

```
* 460233 DUPREE  HR TP                                          3
      PROGRAM BEGIN
       PRINT 100
  100  FORMAT(1HO,40H RATE OF RETURN)
       DO 2 JTP=0,70,1
       TPJ=JTP
       TP=TPJ/100.
       CP=2500.
       X=20.
       XP=10.
       CE=500.
       CS=0.
       R=.04
       T=.30
       Y=.0001
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Z=EQ2-EQ1
       DO 1 I=1,10000
       Y=I
       Y=Y/10000.
       IF(Z)21,20,20
   20  Y=-Y
   21  CONTINUE
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Q=EQ2-EQ1
  102  FORMAT(1HO,3F15.5)
       IF(Z)11,10,10
    10 IF(Q)3,2,1
    11 IF(Q)1,2,3
     3 Y=Y-.0001
       GO TO 2
```

EXHIBIT 6 (Continued)

```
  1  CONTINUE
  2  PRINT 101,JTP,Y
101  FORMAT(1H0,I5,F10.4)
     STOP
    END
    END
```

EXHIBIT 7 — APPENDIX A

COMPUTER PROGRAM FOR CASE Ia — VARYING VALUES FOR CP

```
* 460233 DUPREE  HRCP                                          3
      PROGRAM BEGIN
       PRINT 100
  100  FORMAT(1HO,40H RATE OF RETURN)
       DO 2 JCP=100,2500,100
       CP=JCP
       X=20.
       XP=10.
       CE=500.
       CS=0.
       R=.04
       T=.30
       TP=.20
       Y=.0001
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Z=EQ2-EQ1
       DO 1 I=1,10000
       Y=I
       Y=Y/10000.
       IF(Z)21,20,20
   20  Y=-Y
   21  CONTINUE
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Q=EQ2-EQ1
  102  FORMAT(1HO,3F15.5)
       IF(Z)11,10,10
   10  IF(Q)3,2,1
   11  IF(Q)1,2,3
    3  Y=Y-.0001
       GO TO 2
```

EXHIBIT 7 (Continued)

```
  1  CONTINUE
  2  PRINT 101,JCP,Y
101  FORMAT(1HO,I5,F10.4)
     STOP
    END
    END
```

EXHIBIT 8 — APPENDIX A

COMPUTER PROGRAM FOR CASE Ia — VARYING VALUES FOR CS

```
* 460233 DUPREE HR CS                                          3
      PROGRAM BEGIN
       PRINT 100
  100  FORMAT(1HO,40H RATE OF RETURN)
       DO 2 JCS=0,2500,100
       CS=JCS
       X=20.
       XP=10.
       CE=500.
       CP=2500.
       R=.04
       T=.30
       TP=.20
       Y=.0001
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Z=EQ2-EQ1
       DO 1 I=1,10000
       Y=I
       Y=Y/10000.
       IF(Z)21,20,20
   20  Y=-Y
   21  CONTINUE
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Q=EQ2-EQ1
  102  FORMAT(1HO,3F15.5)
       IF(Z)11,10,10
   10  IF(Q)3,2,1
   11  IF(Q)1,2,3
    3  Y=Y-.0001
       GO TO 2
```

EXHIBIT 8 (Continued)

```
  1  CONTINUE
  2  PRINT 101,JCS,Y
101  FORMAT(1HO,I5,F10.4)
     STOP
    END
    END
```

EXHIBIT 9 -- APPENDIX A

COMPUTER PROGRAM FOR CASE Ia -- VARYING VALUES FOR CE

```
* 460233 DUPREE  HR CE                                          3
      PROGRAM BEGIN
       PRINT 100
  100  FORMAT(1HO,40H RATE OF RETURN)
       DO 2 JCE=0,5000,100
       CE=JCE
       X=20.
       XP=10.
       CP=2500.
       CS=0.
       R=.04
       T=.30
       TP=.20
       Y=.0001
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Z=EQ2-EQ1
       DO 1 I=1,10000
       Y=I
       Y=Y/10000.
       IF(Z)21,20,20
   20  Y=-Y
   21  CONTINUE
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Q=EQ2-EQ1
  102  FORMAT(1HO,3F15.5)
       IF(Z)11,10,10
    10 IF(Q)3,2,1
    11 IF(Q)1,2,3
     3 Y=Y-.0001
       GO TO 2
```

EXHIBIT 9 (Continued)

```
    1  CONTINUE
    2  PRINT 101,JCE,Y
  101  FORMAT(1H0,I5,F10,4)
       STOP
      END
      END
```

EXHIBIT 10 -- APPENDIX A

COMPUTER PROGRAM FOR CASE Ia -- VARYING VALUES FOR X

```
* 460233 DUPREE  HR X                                          3
      PROGRAM BEGIN
       PRINT 100
  100  FORMAT(1HO,40H RATE OF RETURN)
       DO 2 JX=5,40,1
       X=JX
       XP=10.
       CP=2500.
       CE=500.
       CS=0.
       R=.04
       T=.30
       TP=.20
       Y=.0001
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP**C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Z=EQ2-EQ1
       DO 1 I=1,10000
       Y=I
       Y=Y/10000.
       IF(Z)21,20,20
   20  Y=-Y
   21  CONTINUE
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Q=EQ2-EQ1
  102  FORMAT(1HO,3F15.5)
       IF(Z)11,10,10
    10 IF(Q)3,2,1
    11 IF(Q)1,2,3
     3 Y=Y-.0001
       GO TO 2
```

EXHIBIT 10 (Continued)

```
  1  CONTINUE
  2  PRINT 101,JX,Y
101  FORMAT(1HO,I5,F10.4)
     STOP
     END
     END
```

EXHIBIT 11 — APPENDIX A

COMPUTER PROGRAM FOR CASE Ia — VARYING VALUES FOR XP

```
* 460233 DUPREE  HR XP                                          3
      PROGRAM BEGIN
       PRINT 100
  100  FORMAT(1HO,40H RATE OF RETURN)
       DO 2 JXP=1,25,1
       XP=JXP
       X=20.
       CP=2500.
       CE=500.
       CS=0.
       R=.04
       T=.30
       TP=.20
       Y=.0001
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Z=EQ2-EQ1
       DO 1 I=1,10000
       Y=I
       Y=Y/10000.
       IF(Z)21,20,20
   20  Y=-Y
   21  CONTINUE
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*(.5*CP+CS)/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CE+CS-T*(CE+.5*CP))
       Q=EQ2-EQ1
  102  FORMAT(1HO,3F15.5)
       IF(Z)11,10,10
   10  IF(Q)3,2,1
   11  IF(Q)1,2,3
    3  Y=Y-.0001
       GO TO 2
```

EXHIBIT 11 (Continued)

```
  1  CONTINUE
  2  PRINT 101,JXP,Y
101  FORMAT(1H0,I5,F10.4)
     STOP
    END
    END
```

EXHIBIT 12 -- APPENDIX A

COMPUTER PROGRAM FOR CASE Ib -- VARYING VALUES FOR R[1]

```
* 460233 DUPREE  STK EM R                                    3
      PROGRAM BEGIN
       PRINT 100
  100  FORMAT (1HO,40H RATE OF RETURN)
       DO 2 JR=25,2000,25
       RJ=JR
       R=RJ/10000.
       CP=2500.
       X=20.
       XP=10.
       CE=500.
       CS=0.
       T=.30
       TP=.20
       Y=.0001
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*CS/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CS+CE-T*(CP+CE))
       Z=EQ2-EQ1
       DO 1 I=1,10000
       Y=I
       Y=Y/10000.
       IF(Z)21,20,20
   20  Y=-Y
   21  CONTINUE
       A=1.+Y
       B=1.+R
       C=(CP+CS)*(B**X-1.)/(1.-B**(-XP))
       F=A**(-X)
       E=(1.-A**(-XP))/Y
       G=X*CS/XP
       W=(1.-A**(-X))/Y
       EQ1=F*E*(C-TP*(C-G))
       EQ2=W*(CP+CS+CE-T*(CP+CE))
       Q=EQ2-EQ1
  102  FORMAT(1HO,3F15.5)
       IF(Z)11,10,10
   10  IF(Q)3,2,1
   11  IF(Q)1,2,3
    3  Y=Y-.0001
```

EXHIBIT 12 (Continued)

```
      GO TO 2
    1 CONTINUE
    2 PRINT 101,JR,Y
  101 FORMAT(1HO,I5,F10.4)
      STOP
     END
     END
```

---

[1]The programs for Case Ib are the same as those for Ia except for the equations for G and EQ2. When the equations for these functions, as given in this program, are substituted in the programs for Case Ia, the programs will then yield results for stockholder-employees. For this reason, the remaining programs for Case Ib are not reproduced.

APPENDIX B

RATE OF RETURN TABLES

Each of the tables in this Appendix presents after-tax rates of return (i) on investments in H. R. 10 pension plans, under 11 different combinations of values for variables, as one variable is systematically increased while all other independent variables are held constant. Exhibit 13 shows the values assigned to independent variables under each of the 11 cases. In addition, each Table contains two columns (Cases Ib and IIb) that show rates of return on investments by stockholder-employees in corporate pension plans. Case Ib is identical with Case Ia except for the different tax treatment accorded a corporate plan; Case IIb is the same as IIa except for tax treatment.

The rates of return presented in the Tables in this appendix are the results of the computer programs in Appendix A, and of the other variations of these programs. The programs are versions of the rate of return formula developed in Chapter IV. Although the programs compute rates in decimal terms, all rates of return are stated in the Tables as percentages. The rates should be read as though each were followed by a percent sign (%).

H. R. 10 does not permit supplemental contributions (C_s) in excess of basic contributions (C_p). To avoid the problem of having to vary two variables simultaneously, C_s was held at zero for all cases when results for Table 4 were being derived.

EXHIBIT 13 -- APPENDIX B

CASES CONSISTING OF SELECTED COMBINATIONS OF VALUES FOR VARIABLES

r = stated or estimated rate, before taxes, to be earned directly on investments by the pension plan
t = self-employed person's marginal tax rate prior to retirement
t' = self-employed person's marginal tax rate after retirement
C_p = annual basic contributions on behalf of the self-employed person
C_s = supplementary contributions by the self-employed person
C_e = annual basic contributions on behalf of employees
x = years from present until date of retirement
x' = years from date of retirement until the end of the retirement annuity

Variable	I	II	III	IV	V	VI	VII	VIII	IX	X	XI
r	4%	5%	3.75%	5%	5%	5%	6%	6%	10%	15%	20%
t	30%	36%	36%	50%	60%	70%	36%	45%	45%	45%	50%
t'	20%	22%	22%	32%	32%	32%	22%	25%	25%	25%	25%
C_p	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500
C_s	$0	$2,500	$2,500	$2,500	$2,500	$2,500	$0	$2,500	$2,500	$2,500	$2,500
C_e	$500	$1,000	$1,000	$2,000	$3,000	$3,000	$0	$2,000	$2,000	$2,000	$1,000
x	20	20	20	30	30	30	30	30	30	30	30
x'	10	10	10	10	10	10	10	10	10	10	10

TABLE 1 — APPENDIX B. After-Tax Rates of Return to Investors in Certain Pension Plans As r Is Varied from 0.25% to 20.00%
(r = annual return to pension plan investments)

r	I a	I b	II a	II b	III	IV	V	VI	VII	VIII IX & X	XI
0.25%	-0.43	-0.09	-0.43	-0.22	-0.43	-0.61	-0.68	-0.27	0.62	-0.65	-0.02
0.50	-0.20	0.17	-0.22	0.02	-0.22	-0.42	-0.49	-0.08	0.84	-0.44	0.20
0.75	0.03	0.42	-0.02	0.24	-0.02	-0.22	-0.29	0.12	1.06	-0.23	0.41
1.00	0.26	0.67	0.21	0.46	0.21	-0.03	-0.10	0.32	1.28	-0.02	0.62
1.25	0.49	0.92	0.42	0.68	0.42	0.18	0.11	0.52	1.51	0.20	0.83
1.50	0.71	1.17	0.64	0.91	0.64	0.39	0.32	0.72	1.73	0.42	1.04
1.75	0.94	1.42	0.85	1.14	0.85	0.59	0.52	0.92	1.96	0.63	1.26
2.00	1.17	1.67	1.07	1.36	1.07	0.80	0.73	1.13	2.18	0.85	1.47
2.25	1.40	1.92	1.29	1.59	1.29	1.00	0.94	1.33	2.41	1.07	1.69
2.50	1.63	2.17	1.50	1.82	1.50	1.22	1.15	1.54	2.64	1.29	1.91
2.75	1.87	2.42	1.73	2.05	1.73	1.43	1.36	1.75	2.87	1.52	2.13
3.00	2.10	2.68	1.95	2.28	1.95	1.64	1.58	1.97	3.10	1.74	2.35
3.25	2.33	2.93	2.17	2.51	2.17	1.86	1.79	2.18	3.34	1.97	2.58
3.50	2.56	3.18	2.39	2.74	2.39	2.08	2.01	2.40	3.57	2.20	2.80
3.75	2.80	3.43	2.62	2.97	2.62	2.30	2.23	2.62	3.80	2.43	3.03
4.00	3.03	3.68	2.84	3.21	2.84	2.52	2.46	2.84	4.04	2.66	3.26
4.25	3.27	3.93	3.07	3.44	3.07	2.74	2.68	3.06	4.27	2.89	3.48
4.50	3.51	4.18	3.29	3.67	3.29	2.97	2.90	3.28	4.51	3.12	3.71
4.75	3.74	4.43	3.52	3.91	3.52	3.20	3.13	3.51	4.75	3.35	3.95
5.00	3.98	4.68	3.75	4.14	3.75	3.42	3.36	3.74	4.99	3.59	4.18
5.25	4.22	4.93	3.98	4.38	3.98	3.65	3.59	3.96	5.22	3.83	4.41
5.50	4.45	5.18	4.21	4.61	4.21	3.88	3.82	4.19	5.46	4.06	4.65
5.75	4.69	5.43	4.44	4.85	4.44	4.11	4.05	4.42	5.70	4.30	4.88

TABLE 1 (continued)

r	I a	I b	II a	II b	III	IV	V	VI	VII	VIII IX & X	XI
6.00%	4.93	5.68	4.67	5.09	4.67	4.35	4.28	4.65	5.94	4.54	5.12
6.25	5.17	5.93	4.90	5.33	4.90	4.58	4.52	4.89	6.18	4.78	5.35
6.50	5.41	6.18	5.14	5.56	5.14	4.81	4.75	5.12	6.43	5.02	5.59
6.75	5.65	6.43	5.37	5.80	5.37	5.05	4.99	5.36	6.67	5.26	5.83
7.00	5.89	6.68	5.60	6.04	5.60	5.29	5.22	5.59	6.91	5.50	6.07
7.25	6.13	6.93	5.84	6.28	5.84	5.52	5.46	5.83	7.15	5.74	6.31
7.50	6.37	7.18	6.07	6.52	6.07	5.76	5.70	6.06	7.40	5.98	6.55
7.75	6.62	7.43	6.31	6.76	6.31	6.00	5.94	6.30	7.64	6.22	6.79
8.00	6.86	7.68	6.50	7.00	6.54	6.24	6.18	6.54	7.88	6.47	7.03
8.25	7.10	7.93	6.78	7.24	6.78	6.48	6.42	6.78	8.13	6.71	7.27
8.50	7.34	8.18	7.02	7.48	7.02	6.72	6.66	7.02	8.37	6.96	7.52
8.75	7.58	8.43	7.26	7.73	7.26	6.96	6.90	7.26	8.62	7.20	7.76
9.00	7.83	8.68	7.49	7.97	7.49	7.21	7.14	7.50	8.86	7.44	8.00
9.25	8.07	8.93	7.73	8.21	7.73	7.45	7.39	7.74	9.11	7.69	8.25
9.50	8.31	9.18	7.97	8.45	7.97	7.69	7.63	7.99	9.35	7.93	8.49
9.75	8.56	9.43	8.21	8.70	8.21	7.93	7.87	8.23	9.60	8.18	8.74
10.00	8.80	9.68	8.45	8.94	8.45	8.18	8.12	8.47	9.85	8.43	8.98
10.25	9.05	9.93	8.69	9.18	8.69	8.42	8.36	8.72	10.09	8.67	9.23
10.50	9.29	10.18	8.93	9.43	8.93	8.67	8.61	8.96	10.34	8.92	9.47
10.75	9.53	10.43	9.17	9.67	9.17	8.91	8.85	9.20	10.59	9.17	9.72
11.00	9.78	10.68	9.41	9.91	9.41	9.16	9.10	9.45	10.83	9.41	9.96
11.25	10.02	10.93	9.65	10.16	9.65	9.40	9.34	9.69	11.08	9.66	10.21
11.50	10.27	11.18	9.90	10.40	9.90	9.65	9.59	9.94	11.33	9.91	10.46
11.75	10.51	11.43	10.14	10.65	10.14	9.89	9.83	10.18	11.58	10.16	10.70

TABLE 1 (continued)

r	I a	I b	II a	II b	III	IV	V	VI	VII	VIII IX & X	XI
12.00%	10.76	11.68	10.38	10.89	10.38	10.14	10.08	10.43	11.82	10.40	10.95
12.25	11.01	11.93	10.62	11.14	10.62	10.39	10.33	10.68	12.07	10.65	11.20
12.50	11.25	12.18	10.87	11.38	10.87	10.63	10.57	10.92	12.32	10.90	11.44
12.75	11.50	12.43	11.11	11.63	11.11	10.88	10.82	11.17	12.57	11.15	11.69
13.00	11.74	12.68	11.35	11.87	11.35	11.13	11.07	11.41	12.82	11.39	11.94
13.25	11.99	12.93	11.59	12.12	11.59	11.37	11.31	11.66	13.06	11.64	12.19
13.50	12.23	13.18	11.84	12.36	11.84	11.62	11.56	11.91	13.31	11.89	12.43
13.75	12.48	13.43	12.08	12.61	12.08	11.87	11.81	12.15	13.56	12.14	12.68
14.00	12.73	13.68	12.33	12.85	12.33	12.12	12.06	12.40	13.81	12.39	12.93
14.25	12.97	13.93	12.57	13.10	12.57	12.36	12.30	12.65	14.06	12.64	13.18
14.50	13.22	14.18	12.81	13.35	12.81	12.61	12.55	12.90	14.31	12.88	13.42
14.75	13.47	14.43	13.06	13.59	13.06	12.86	12.80	13.14	14.56	13.13	13.67
15.00	13.71	14.68	13.30	13.84	13.30	13.11	13.05	13.39	14.80	13.38	13.92
15.25	13.96	14.93	13.55	14.08	13.55	13.35	13.29	13.64	15.05	13.63	14.17
15.50	14.21	15.18	13.79	14.33	13.79	13.60	13.54	13.89	15.30	13.88	14.42
15.75	14.45	15.43	14.04	14.58	14.04	13.85	13.79	14.13	15.55	14.13	14.67
16.00	14.70	15.68	14.28	14.82	14.28	14.10	14.04	14.38	15.80	14.37	14.91
16.25	14.95	15.93	14.53	15.07	14.53	14.35	14.29	14.63	16.05	14.62	15.16
16.50	15.20	16.18	14.77	15.32	14.77	14.59	14.53	14.88	16.30	14.89	15.41
16.75	15.44	16.43	15.02	15.56	15.02	14.84	14.78	15.13	16.55	15.12	15.66
17.00	15.69	16.68	15.26	15.81	15.26	15.09	15.03	15.37	16.80	15.37	15.91
17.25	15.94	16.93	15.51	16.06	15.51	15.34	15.28	15.62	17.05	15.62	16.16
17.50	16.18	17.18	15.76	16.31	15.76	15.59	15.53	15.87	17.29	15.87	16.40
17.75	16.43	17.43	16.00	16.55	16.00	15.83	15.78	16.12	17.54	16.11	16.65

TABLE 1 (continued)

r	I		II		III	IV	V	VI	VII	VIII IX & X	XI
	a	b	a	b							
18.00%	16.68	17.68	16.25	16.80	16.25	16.08	16.02	16.37	17.79	16.36	16.90
18.25	16.93	17.93	16.49	17.05	16.49	16.33	16.27	16.61	18.04	16.61	17.15
18.50	17.17	18.18	16.74	17.30	16.74	16.58	16.52	16.86	18.29	16.89	17.40
18.75	17.42	18.43	16.99	17.54	16.99	16.83	16.77	17.11	18.54	17.11	17.65
19.00	17.67	18.68	17.23	17.79	17.23	17.07	17.02	17.36	18.79	17.36	17.90
19.25	17.92	18.93	17.48	18.04	17.48	17.32	17.26	17.61	19.04	17.61	18.15
19.50	18.16	19.18	17.72	18.28	17.72	17.57	17.51	17.86	19.29	17.85	18.39
19.75	18.41	19.43	17.97	18.53	17.97	17.82	17.76	18.10	19.54	18.10	18.64
20.00	18.66	19.68	18.22	18.78	18.22	18.07	18.01	18.35	19.79	18.35	18.89

TABLE 2 — APPENDIX B. After-Tax Rates of Return to Investors in Certain Pension Plans As t Is Varied from 14% to 70%
(t = marginal tax rate before retirement)

	I		II									
t	a	b	a	b	III	IV	V & VI	VII	VIII	IX	X	XI
14%	2.33	2.33	3.15	3.16	2.02	2.50	1.91	5.38	3.77	7.70	12.67	18.24
15	2.37	2.41	3.18	3.20	2.04	2.52	1.94	5.40	3.79	7.72	12.69	18.26
16	2.42	2.48	3.21	3.24	2.07	2.55	1.97	5.43	3.81	7.74	12.71	18.27
17	2.46	2.56	3.23	3.29	2.10	2.57	1.99	5.45	3.84	7.76	12.73	18.29
18	2.50	2.64	3.26	3.33	2.12	2.59	2.02	5.48	3.86	7.78	12.76	18.31
19	2.54	2.72	3.29	3.37	2.15	2.62	2.05	5.50	3.88	7.81	12.78	18.32
20	2.59	2.80	3.31	3.41	2.18	2.64	2.08	5.53	3.91	7.83	12.80	18.34
22	2.67	2.97	3.37	3.50	2.23	2.69	2.13	5.58	3.96	7.87	12.84	18.38
25	2.81	3.23	3.45	3.63	2.31	2.76	2.22	5.65	4.03	7.94	12.91	18.43
27	2.90	3.40	3.50	3.72	2.36	2.81	2.28	5.70	4.08	7.99	12.95	18.46
28	2.94	3.49	3.53	3.77	2.39	2.84	2.31	5.73	4.10	8.01	12.98	18.48
31	3.08	3.77	3.61	3.91	2.48	2.91	2.40	5.81	4.18	8.08	13.05	18.53
32	3.13	3.87	3.64	3.95	2.50	2.94	2.43	5.84	4.20	8.11	13.07	18.55
35	3.27	4.16	3.72	4.09	2.59	3.02	2.52	5.92	4.28	8.18	13.14	18.61
36	3.32	4.26	3.75	4.14	2.62	3.04	2.55	5.94	4.30	8.20	13.16	18.63
39	3.46	4.57	3.84	4.29	2.70	3.12	2.65	6.03	4.38	8.28	13.23	18.68
40	3.50	4.68	3.86	4.34	2.73	3.15	2.68	6.05	4.41	8.30	13.26	18.70
41	3.56	4.79	3.89	4.39	2.76	3.18	2.71	6.08	4.43	8.33	13.28	18.72
42	3.61	4.90	3.92	4.44	2.79	3.20	2.74	6.11	4.46	8.35	13.31	18.74
43	3.66	5.01	3.95	4.49	2.82	3.23	2.78	6.14	4.48	8.38	13.33	18.76
45	3.77	5.24	4.01	4.59	2.88	3.28	2.84	6.20	4.54	8.43	13.38	18.79
46	3.82	5.36	4.04	4.64	2.91	3.31	2.87	6.23	4.56	8.45	13.41	18.81
48	3.92	5.61	4.10	4.75	2.97	3.37	2.94	6.28	4.62	8.50	13.46	18.85
50	4.03	5.86	4.16	4.85	3.03	3.42	3.01	6.34	4.67	8.56	13.51	18.89
52	4.14	6.12	4.22	4.96	3.09	3.48	3.08	6.40	4.73	8.61	13.56	18.93

TABLE 2 (continued)

t	I a	I b	II a	II b	III	IV	V & VI	VII	VIII	IX	X	XI
53%	4.19	6.26	4.25	5.01	3.12	3.51	3.11	6.43	4.75	8.64	13.58	18.95
55	4.30	6.54	4.31	5.12	3.18	3.57	3.18	6.49	4.81	8.69	13.64	18.99
56	4.36	6.69	4.34	5.18	3.21	3.60	3.22	6.52	4.84	8.72	13.66	19.01
58	4.47	6.98	4.40	5.29	3.27	3.65	3.29	6.59	4.90	8.77	13.72	19.05
59	4.53	7.14	4.43	5.35	3.30	3.68	3.32	6.62	4.93	8.80	13.74	19.07
60	4.59	7.30	4.46	5.41	3.34	3.71	3.36	6.65	4.96	8.83	13.77	19.09
61	4.65	7.46	4.50	5.47	3.37	3.74	3.40	6.68	4.99	8.86	13.80	19.11
62	4.71	7.63	4.53	5.53	3.40	3.77	3.43	6.71	5.02	8.88	13.83	19.13
63	4.77	7.80	4.56	5.58	3.43	3.80	3.47	6.75	5.05	8.91	13.85	19.15
64	4.83	7.98	4.59	5.64	3.46	3.83	3.51	6.78	5.08	8.94	13.88	19.17
66	4.95	8.34	4.66	5.77	3.53	3.90	3.58	6.84	5.14	9.00	13.94	19.22
67	5.01	8.53	4.69	5.83	3.56	3.93	3.62	6.88	5.17	9.03	13.97	19.24
68	5.07	8.73	4.72	5.89	3.59	3.96	3.66	6.91	5.20	9.06	14.00	19.26
69	5.13	8.93	4.75	5.95	3.63	3.99	3.70	6.94	5.23	9.09	14.02	19.28
70	5.20	9.14	4.79	6.02	3.66	4.02	3.74	6.98	5.26	9.12	14.05	19.30

TABLE 3 -- APPENDIX B. After-Tax Rates of Return to Investors in Certain Pension Plans As t' Is Varied from 0% to 70%
(t' = marginal tax rate after retirement)

t'	I a	I b	II a	II b	III	IV	V	VI	VII	VIII	IX	X	XI
0%	4.06	5.13	4.75	5.34	3.50	4.67	4.60	4.97	6.88	5.54	9.55	14.56	20.10
14	3.36	4.15	4.13	4.60	2.95	4.17	4.10	4.47	6.31	5.01	8.96	13.94	19.47
15	3.31	4.07	4.09	4.55	2.91	4.13	4.06	4.44	6.26	4.97	8.91	13.89	19.42
16	3.25	3.99	4.04	4.49	2.87	4.09	4.03	4.40	6.22	4.92	8.87	13.85	19.37
17	3.20	3.92	3.99	4.44	2.83	4.05	3.99	4.36	6.18	4.88	8.82	13.80	19.32
18	3.14	3.84	3.94	4.38	2.79	4.01	3.95	4.32	6.13	4.84	8.77	13.75	19.27
19	3.09	3.76	3.90	4.32	2.74	3.97	3.91	4.28	6.08	4.80	8.73	13.70	19.21
20	3.03	3.68	3.85	4.26	2.70	3.93	3.87	4.24	6.04	4.76	8.68	13.64	19.16
22	2.92	3.51	3.75	4.14	2.62	3.85	3.79	4.16	5.94	4.67	8.58	13.54	19.06
25	2.75	3.26	3.60	3.96	2.48	3.73	3.66	4.04	5.80	4.54	8.43	13.38	18.89
27	2.63	3.08	3.50	3.83	2.40	3.64	3.58	3.95	5.70	4.45	8.32	13.27	18.78
28	2.57	2.99	3.45	3.77	2.35	3.60	3.54	3.91	5.65	4.40	8.27	13.21	18.72
31	2.39	2.71	3.29	3.58	2.21	3.47	3.40	3.78	5.49	4.26	8.10	13.04	18.54
32	2.33	2.61	3.23	3.51	2.17	3.42	3.36	3.74	5.44	4.21	8.05	12.98	18.48
35	2.14	2.32	3.07	3.31	2.03	3.29	3.22	3.60	5.28	4.06	7.87	12.80	18.29
36	2.07	2.22	3.02	3.24	1.98	3.24	3.17	3.55	5.22	4.01	7.81	12.73	18.23
39	1.87	1.90	2.85	3.03	1.83	3.10	3.03	3.41	5.05	3.86	7.63	12.54	18.03
40	1.81	1.79	2.79	2.96	1.79	3.05	2.98	3.36	4.99	3.80	7.57	12.47	17.96
41	1.74	1.68	2.73	2.89	1.74	3.00	2.93	3.31	4.93	3.75	7.50	12.40	17.89
42	1.67	1.57	2.67	2.81	1.69	2.95	2.88	3.26	4.87	3.69	7.44	12.33	17.81
43	1.60	1.45	2.62	2.74	1.64	2.90	2.83	3.21	4.81	3.64	7.37	12.26	17.74
45	1.46	1.22	2.50	2.59	1.53	2.79	2.73	3.11	4.68	3.53	7.24	12.12	17.59
46	1.39	1.09	2.44	2.51	1.48	2.74	2.68	3.06	4.61	3.47	7.17	12.04	17.52
48	1.24	0.84	2.31	2.35	1.38	2.63	2.57	2.95	4.48	3.35	7.03	11.89	17.36
50	1.09	0.58	2.19	2.19	1.27	2.53	2.46	2.84	4.35	3.23	6.88	11.73	17.20
52	0.94	0.31	2.06	2.02	1.17	2.41	2.35	2.73	4.21	3.11	6.73	11.56	17.03

TABLE 3 (continued)

t'	I a	I b	II a	II b	III	IV	V	VI	VII	VIII	IX	X	XI
53%	0.86	0.17	1.99	1.94	1.11	2.36	2.29	2.67	4.13	3.04	6.65	11.48	16.94
55	0.70	-0.13	1.86	1.77	1.00	2.24	2.17	2.56	3.99	2.91	6.49	11.30	16.76
56	0.62	-0.28	1.80	1.68	0.94	2.18	2.11	2.50	3.91	2.85	6.40	11.21	16.66
58	0.46	-0.59	1.66	1.50	0.83	2.06	1.99	2.38	3.75	2.71	6.23	11.02	16.47
59	0.37	-0.75	1.59	1.41	0.77	2.00	1.93	2.32	3.67	2.64	6.15	10.93	16.37
60	0.29	-0.91	1.52	1.31	0.71	1.93	1.87	2.25	3.59	2.57	6.06	10.83	16.27
61	0.20	-1.08	1.45	1.22	0.66	1.87	1.80	2.19	3.51	2.50	5.96	10.75	16.16
62	0.11	-1.26	1.38	1.12	0.60	1.80	1.74	2.13	3.42	2.43	5.87	10.62	16.06
63	0.02	-1.44	1.31	1.03	0.54	1.74	1.67	2.06	3.34	2.35	5.77	10.52	15.95
64	-0.08	-1.62	1.23	0.93	0.48	1.67	1.60	1.99	3.25	2.28	5.68	10.41	15.83
66	-0.26	-2.01	1.08	0.72	0.35	1.53	1.47	1.86	3.06	2.12	5.47	10.18	15.60
67	-0.36	-2.21	1.01	0.62	0.29	1.46	1.40	1.79	2.97	2.04	5.37	10.06	15.47
68	-0.45	-2.42	0.93	0.52	0.23	1.39	1.32	1.72	2.87	1.96	5.26	9.94	15.34
69	-0.55	-2.63	0.85	0.41	0.17	1.32	1.25	1.64	2.78	1.88	5.15	9.81	15.21
70	-0.65	-2.86	0.78	0.30	0.10	1.25	1.18	1.57	2.67	1.79	5.03	9.68	15.08

TABLE 4 — APPENDIX B. After-Tax Rates of Return to Investors in Certain Pension Plans As C_p Is Varied from $100 to $2,500 (while C_s is held at $0)
(C_p = annual basic contributions for "self-employed" person)

C_p	I		II		III	IV	V	VI	VII	VIII	IX	X	XI
	a	b	a	b									
$ 100	-6.99	-7.20	-9.68	-9.95	-10.96	-9.13	-10.20	-8.46	5.94	-7.92	-2.84	2.97	11.36
200	-3.42	-3.47	-5.55	-5.68	-6.80	-5.37	-6.26	-4.74	5.94	-4.25	0.41	5.86	13.79
300	-1.70	-1.62	-3.43	-3.44	-4.66	-3.46	-4.23	-2.85	5.94	-2.37	2.09	7.39	15.04
400	-0.65	-0.48	-2.08	-1.99	-3.29	-2.23	-2.92	-1.64	5.94	-1.16	3.18	8.40	15.85
500	0.07	0.31	-1.12	-0.95	-2.33	-1.36	-1.98	-0.77	5.94	-0.30	3.97	9.14	16.41
600	0.59	0.89	-0.40	-0.16	-1.61	-0.70	-1.27	-0.11	5.94	0.37	4.57	9.71	16.83
700	0.99	1.34	0.17	0.47	-1.04	-0.17	-0.69	0.42	5.94	0.89	5.05	10.16	17.16
800	1.31	1.69	0.62	0.98	-0.58	0.26	-0.22	0.85	5.94	1.31	5.45	10.54	17.43
900	1.56	1.98	1.00	1.40	-0.21	0.62	0.18	1.21	5.94	1.67	5.78	10.86	17.65
1,000	1.77	2.22	1.31	1.76	0.12	0.92	0.52	1.51	5.94	1.97	6.06	11.13	17.83
1,100	1.95	2.42	1.58	2.06	0.39	1.18	0.81	1.77	5.94	2.24	6.31	11.36	17.99
1,200	2.10	2.59	1.81	2.33	0.63	1.41	1.06	2.00	5.94	2.46	6.52	11.57	18.13
1,300	2.23	2.74	2.01	2.56	0.83	1.61	1.29	2.20	5.94	2.67	6.71	11.75	18.24
1,400	2.34	2.87	2.19	2.77	1.01	1.79	1.49	2.38	5.94	2.84	6.88	11.91	18.35
1,500	2.44	2.99	2.35	2.96	1.17	1.94	1.67	2.54	5.94	3.01	7.03	12.06	18.44
1,600	2.53	3.09	2.49	3.12	1.31	2.09	1.83	2.68	5.94	3.15	7.17	12.19	18.52
1,700	2.61	3.18	2.62	3.27	1.44	2.22	1.98	2.81	5.94	3.28	7.29	12.31	18.60
1,800	2.68	3.27	2.74	3.41	1.56	2.33	2.12	2.93	5.94	3.40	7.40	12.42	18.66
1,900	2.75	3.34	2.84	3.53	1.66	2.44	2.24	3.04	5.94	3.51	7.51	12.51	18.72
2,000	2.81	3.41	2.94	3.64	1.76	2.54	2.35	3.14	5.94	3.61	7.60	12.61	18.78
2,100	2.86	3.47	3.03	3.75	1.85	2.63	2.46	3.23	5.94	3.70	7.69	12.69	18.83
2,200	2.91	3.53	3.11	3.85	1.93	2.72	2.56	3.32	5.94	3.79	7.77	12.77	18.88
2,300	2.95	3.58	3.18	3.93	2.01	2.79	2.65	3.40	5.94	3.87	7.85	12.84	18.92
2,400	3.00	3.63	3.25	4.02	2.08	2.87	2.73	3.47	5.94	3.94	7.92	12.91	18.96
2,500	3.03	3.68	3.32	4.09	2.14	2.93	2.81	3.54	5.94	4.01	7.98	12.98	19.00

TABLE 5 — APPENDIX B. After-Tax Rates of Return to Investors in Certain Pension Plans As C_s Is Varied from $0 to $2,500
(C_s = annual supplementary contributions by "self-employed" person)

C_s	I		II		III	IV	V	VI	VII	VIII	IX	X	XI
	a	b	a	b									
$ 0	3.03	3.68	3.32	4.09	2.14	2.93	2.81	3.54	5.94	4.01	7.98	12.98	19.00
100	3.05	3.66	3.35	4.10	2.18	2.97	2.85	3.56	5.91	4.05	8.02	13.00	18.99
200	3.06	3.65	3.38	4.10	2.21	3.01	2.89	3.57	5.88	4.09	8.05	13.03	18.98
300	3.07	3.64	3.41	4.11	2.24	3.04	2.93	3.58	5.86	4.12	8.07	13.06	18.97
400	3.08	3.63	3.44	4.11	2.27	3.07	2.96	3.60	5.83	4.15	8.10	13.08	18.97
500	3.09	3.62	3.46	4.11	2.30	3.10	2.99	3.61	5.81	4.18	8.13	13.11	18.96
600	3.10	3.61	3.48	4.11	2.33	3.12	3.02	3.62	5.79	4.21	8.15	13.13	18.96
700	3.11	3.60	3.51	4.12	2.35	3.15	3.05	3.63	5.77	4.24	8.17	13.15	18.95
800	3.12	3.59	3.53	4.12	2.37	3.17	3.08	3.64	5.75	4.26	8.19	13.17	18.95
900	3.13	3.59	3.55	4.12	2.39	3.19	3.10	3.64	5.74	4.29	8.21	13.19	18.94
1,000	3.13	3.58	3.56	4.12	2.41	3.21	3.12	3.65	5.72	4.31	8.23	13.20	18.94
1,100	3.14	3.57	3.58	4.12	2.43	3.23	3.14	3.66	5.70	4.33	8.25	13.22	18.93
1,200	3.15	3.57	3.60	4.13	2.45	3.25	3.16	3.67	5.69	4.35	8.27	13.23	18.93
1,300	3.15	3.56	3.61	4.13	2.47	3.27	3.18	3.68	5.68	4.37	8.28	13.25	18.92
1,400	3.16	3.56	3.63	4.13	2.48	3.28	3.20	3.68	5.66	4.39	8.30	13.26	18.92
1,500	3.16	3.55	3.64	4.13	2.50	3.30	3.22	3.69	5.65	4.40	8.31	13.28	18.92
1,600	3.17	3.55	3.65	4.13	2.51	3.31	3.24	3.69	5.64	4.42	8.33	13.29	18.91
1,700	3.17	3.54	3.67	4.13	2.53	3.33	3.25	3.70	5.63	4.43	8.34	13.30	18.91
1,800	3.18	3.54	3.68	4.13	2.54	3.34	3.27	3.70	5.62	4.45	8.35	13.31	18.91
1,900	3.18	3.53	3.69	4.14	2.55	3.36	3.28	3.71	5.61	4.46	8.36	13.32	18.91
2,000	3.19	3.53	3.70	4.14	2.56	3.37	3.30	3.71	5.60	4.48	8.38	13.33	18.90
2,100	3.19	3.53	3.71	4.14	2.57	3.38	3.31	3.72	5.59	4.49	8.39	13.34	18.90
2,200	3.20	3.52	3.72	4.14	2.59	3.39	3.32	3.72	5.58	4.50	8.40	13.35	18.90
2,300	3.20	3.52	3.73	4.14	2.60	3.40	3.34	3.73	5.58	4.51	8.41	13.36	18.90
2,400	3.20	3.52	3.74	4.14	2.61	3.41	3.35	3.73	5.57	4.53	8.42	13.37	18.89
2,500	3.21	3.51	3.75	4.14	2.62	3.42	3.36	3.74	5.56	4.54	8.43	13.38	18.89

TABLE 6 — APPENDIX B. After-Tax Rates of Return to Investors in Certain Pension Plans As C_e Is Varied from $0 to $5,000 ($C_e$ = annual contributions for employees)

C_e	I		II		III	IV	V	VI	VII	VIII	IX	X	XI
	a	b	a	b									
$ 0	4.03	4.86	4.61	5.08	3.48	4.37	4.51	4.64	5.94	5.54	9.39	14.32	19.35
100	3.82	4.61	4.52	4.98	3.39	4.32	4.46	4.61	5.81	5.49	9.33	14.27	19.30
200	3.61	4.36	4.43	4.88	3.30	4.27	4.42	4.58	5.67	5.43	9.28	14.22	19.25
300	3.41	4.13	4.34	4.79	3.21	4.22	4.38	4.54	5.54	5.38	9.23	14.16	19.21
400	3.22	3.90	4.25	4.69	3.12	4.17	4.34	4.51	5.42	5.32	9.18	14.11	19.16
500	3.03	3.68	4.16	4.60	3.03	4.12	4.30	4.48	5.29	5.27	9.13	14.06	19.11
600	2.85	3.46	4.08	4.50	2.95	4.07	4.26	4.45	5.17	5.22	9.08	14.02	19.07
700	2.67	3.26	4.00	4.41	2.86	4.02	4.21	4.42	5.05	5.17	9.03	13.97	19.02
800	2.50	3.05	3.91	4.32	2.78	3.97	4.17	4.38	4.94	5.12	8.98	13.92	18.98
900	2.33	2.86	3.83	4.23	2.70	3.92	4.13	4.35	4.83	5.06	8.93	13.87	18.94
1,000	2.17	2.67	3.75	4.14	2.62	3.88	4.09	4.32	4.72	5.01	8.88	13.82	18.89
1,100	2.01	2.48	3.69	4.06	2.54	3.83	4.05	4.29	4.61	4.96	8.83	13.78	18.85
1,200	1.85	2.30	3.59	3.97	2.46	3.78	4.02	4.26	4.50	4.91	8.79	13.73	18.81
1,300	1.69	2.13	3.51	3.88	2.38	3.74	3.98	4.23	4.40	4.87	8.74	13.69	18.76
1,400	1.54	1.96	3.44	3.80	2.30	3.69	3.94	4.20	4.30	4.82	8.69	13.64	18.72
1,500	1.40	1.79	3.36	3.72	2.22	3.64	3.90	4.17	4.20	4.77	8.65	13.60	18.68
1,600	1.25	1.63	3.28	3.63	2.15	3.60	3.86	4.14	4.11	4.72	8.60	13.55	18.64
1,700	1.11	1.47	3.21	3.55	2.07	3.56	3.82	4.11	4.01	4.68	8.56	13.51	18.60
1,800	0.97	1.31	3.14	3.47	2.00	3.51	3.79	4.08	3.92	4.63	8.51	13.47	18.56
1,900	0.84	1.16	3.06	3.39	1.92	3.47	3.75	4.05	3.83	4.58	8.47	13.42	18.52
2,000	0.70	1.01	2.99	3.32	1.85	3.42	3.71	4.02	3.74	4.54	8.43	13.38	18.48
2,100	0.57	0.87	2.92	3.24	1.78	3.38	3.68	3.99	3.65	4.49	8.38	13.34	18.44
2,200	0.45	0.72	2.85	3.16	1.71	3.34	3.64	3.96	3.56	4.45	8.34	13.30	18.40
2,300	0.32	0.58	2.78	3.09	1.64	3.30	3.60	3.93	3.48	4.40	8.30	13.26	18.36
2,400	0.20	0.45	2.71	3.01	1.57	3.25	3.57	3.90	3.39	4.36	8.26	13.22	18.32
2,500	0.07	0.31	2.64	2.94	1.50	3.21	3.53	3.88	3.31	4.32	8.22	13.17	18.28

TABLE 6 (continued)

C_e	I a	I b	II a	II b	III	IV	V	VI	VII	VIII	IX	X	XI
$2,600	-0.06	0.18	2.57	2.87	1.43	3.17	3.50	3.85	3.23	4.27	8.17	13.13	18.25
2,700	-0.17	0.05	2.50	2.79	1.36	3.13	3.46	3.82	3.15	4.23	8.13	13.10	18.21
2,800	-0.29	-0.08	2.44	2.72	1.30	3.09	3.43	3.79	3.07	4.19	8.09	13.06	18.17
2,900	-0.40	-0.21	2.37	2.65	1.23	3.05	3.39	3.76	2.99	4.14	8.05	13.02	18.14
3,000	-0.51	-0.33	2.31	2.58	1.16	3.01	3.36	3.74	2.92	4.10	8.01	12.98	18.10
3,100	-0.62	-0.45	2.24	2.51	1.10	2.97	3.32	3.71	2.84	4.06	7.97	12.94	18.06
3,200	-0.73	-0.57	2.18	2.44	1.03	2.93	3.29	3.68	2.77	4.02	7.93	12.90	18.03
3,300	-0.84	-0.69	2.11	2.37	0.97	2.89	3.26	3.65	2.69	3.98	7.90	12.86	17.99
3,400	-0.94	-0.80	2.05	2.31	0.91	2.85	3.22	3.63	2.62	3.94	7.86	12.83	17.96
3,500	-1.05	-0.91	1.99	2.24	0.84	2.81	3.19	3.60	2.55	3.90	7.82	12.79	17.92
3,600	-1.15	-1.03	1.93	2.17	0.78	2.77	3.16	3.57	2.48	3.86	7.78	12.75	17.89
3,700	-1.25	-1.13	1.87	2.11	0.72	2.74	3.12	3.55	2.41	3.82	7.74	12.72	17.85
3,800	-1.35	-1.24	1.81	2.04	0.66	2.70	3.09	3.52	2.34	3.78	7.71	12.68	17.82
3,900	-1.45	-1.35	1.75	1.98	0.60	2.66	3.06	3.49	2.27	3.74	7.67	12.65	17.79
4,000	-1.54	-1.45	1.69	1.92	0.54	2.62	3.03	3.47	2.21	3.70	7.63	12.61	17.75
4,100	-1.64	-1.56	1.63	1.85	0.48	2.59	3.00	3.44	2.14	3.67	7.60	12.58	17.72
4,200	-1.73	-1.66	1.57	1.79	0.42	2.55	2.96	3.41	2.08	3.63	7.56	12.54	17.69
4,300	-1.82	-1.76	1.51	1.73	0.36	2.51	2.93	3.39	2.01	3.59	7.53	12.51	17.66
4,400	-1.92	-1.86	1.45	1.67	0.30	2.48	2.90	3.36	1.95	3.55	7.49	12.47	17.62
4,500	-2.01	-1.95	1.40	1.61	0.25	2.44	2.87	3.34	1.89	3.52	7.46	12.44	17.59
4,600	-2.09	-2.05	1.34	1.55	0.19	2.40	2.84	3.31	1.83	3.48	7.42	12.40	17.56
4,700	-2.18	-2.14	1.28	1.49	0.13	2.37	2.81	3.29	1.76	3.44	7.39	12.37	17.53
4,800	-2.27	-2.24	1.23	1.43	0.08	2.33	2.78	3.26	1.70	3.41	7.35	12.34	17.50
4,900	-2.36	-2.33	1.17	1.37	0.02	2.30	2.75	3.24	1.64	3.37	7.32	12.31	17.47
5,000	-2.44	-2.42	1.12	1.31	-0.05	2.26	2.72	3.21	1.58	3.33	7.28	12.27	17.43

TABLE 7 -- APPENDIX B. After-Tax Rates of Return to Investors in Certain Pension Plans As x Is Varied from 5 to 40 Years
(x = number of years until retirement)

x	I		II		III	IV	V	VI	VII	VIII	IX	X	XI
	a	b	a	b									
5	2.25	3.30	2.88	3.54	1.83	1.63	1.44	2.56	6.56	2.56	5.83	10.01	16.47
6	2.34	3.35	2.98	3.61	1.93	1.79	1.61	2.66	6.49	2.73	6.06	10.31	16.67
7	2.43	3.39	3.07	3.67	2.01	1.93	1.76	2.75	6.42	2.89	6.26	10.58	16.86
8	2.50	3.43	3.15	3.73	2.08	2.06	1.90	2.83	6.36	3.04	6.44	10.83	17.04
9	2.57	3.46	3.22	3.78	2.15	2.17	2.03	2.90	6.31	3.17	6.61	11.06	17.20
10	2.63	3.49	3.29	3.83	2.21	2.28	2.14	2.97	6.27	3.28	6.77	11.26	17.35
11	2.69	3.52	3.35	3.87	2.26	2.38	2.24	3.03	6.23	3.39	6.91	11.46	17.49
12	2.74	3.54	3.41	3.91	2.32	2.47	2.34	3.09	6.20	3.49	7.04	11.63	17.62
13	2.79	3.56	3.46	3.94	2.36	2.55	2.43	3.15	6.17	3.59	7.17	11.80	17.74
14	2.83	3.58	3.51	3.98	2.41	2.63	2.51	3.20	6.14	3.67	7.82	11.95	17.85
15	2.87	3.60	3.56	4.01	2.45	2.70	2.59	3.24	6.11	3.75	7.39	12.09	17.96
16	2.91	3.62	3.60	4.04	2.49	2.77	2.66	3.29	6.09	3.83	7.49	12.22	18.05
17	2.94	3.64	3.64	4.07	2.52	2.83	2.73	3.33	6.07	3.90	7.58	12.34	18.14
18	2.97	3.65	3.68	4.09	2.55	2.90	2.80	3.37	6.06	3.96	7.67	12.46	18.23
19	3.00	3.66	3.72	4.12	2.59	2.95	2.86	3.41	6.04	4.03	7.76	12.56	18.31
20	3.03	3.68	3.75	4.14	2.62	3.01	2.92	3.45	6.03	4.09	7.83	12.66	18.38
21	3.06	3.69	3.78	4.16	2.64	3.06	2.97	3.48	6.01	4.14	7.91	12.76	18.45
22	3.09	3.70	3.81	4.19	2.67	3.11	3.02	3.51	6.00	4.20	7.98	12.84	18.51
23	3.11	3.71	3.84	4.21	2.70	3.15	3.07	3.55	5.99	4.25	8.05	12.93	18.57
24	3.13	3.72	3.87	4.23	2.72	3.20	3.12	3.58	5.98	4.29	8.11	13.00	18.62
25	3.16	3.73	3.90	4.24	2.74	3.24	3.16	3.61	5.97	4.34	8.17	13.08	18.68
26	3.18	3.74	3.92	4.26	2.76	3.28	3.20	3.63	5.97	4.38	8.23	13.14	18.73
27	3.20	3.75	3.95	4.28	2.79	3.32	3.25	3.66	5.96	4.42	8.28	13.21	18.77
28	3.22	3.76	3.97	4.29	2.81	3.35	3.28	3.69	5.95	4.46	8.33	13.27	18.81
29	3.23	3.76	3.99	4.31	2.82	3.39	3.32	3.71	5.95	4.50	8.38	13.33	18.85
30	3.25	3.77	4.01	4.32	2.84	3.42	3.36	3.74	5.94	4.54	8.43	13.38	18.89

TABLE 7 (continued)

x	I a	I b	II a	II b	III	IV	V	VI	VII	VIII	IX	X	XI
31	3.27	3.77	4.03	4.34	2.86	3.46	3.39	3.76	5.94	4.57	8.47	13.43	18.93
32	3.28	3.78	4.05	4.35	2.88	3.49	3.43	3.78	5.94	4.61	8.51	13.48	18.96
33	3.30	3.79	4.07	4.39	2.89	3.52	3.46	3.80	5.93	4.64	8.55	13.53	18.99
34	3.31	3.79	4.09	4.38	2.91	3.55	3.49	3.83	5.93	4.67	8.59	13.57	19.02
35	3.33	3.80	4.11	4.39	2.92	3.58	3.52	3.85	5.93	4.70	8.63	13.61	19.05
36	3.34	3.81	4.13	4.40	2.94	3.60	3.55	3.87	5.92	4.73	8.67	13.65	19.08
37	3.35	3.81	4.14	4.41	2.95	3.63	3.58	3.89	5.92	4.75	8.70	13.69	19.10
38	3.37	3.81	4.16	4.42	2.97	3.66	3.60	3.91	5.92	4.78	8.73	13.72	19.13
39	3.38	3.82	4.18	4.44	2.98	3.68	3.63	3.92	5.92	4.81	8.76	13.76	19.15
40	3.39	3.82	4.19	4.45	2.99	3.71	3.66	3.94	5.92	4.83	8.79	13.79	19.17

TABLE 8 — APPENDIX B. After-Tax Rates of Return to Investors in Certain Pension Plans As x' Is Varied from 0 to 25 Years
(x' = number of years after retirement that annuity is to run)

x'	I		II		III	IV	V	VI	VII	VIII	IX	X	XI
	a	b	a	b									
0*	2.70	3.52	3.41	3.91	2.27	3.14	3.06	3.55	6.01	4.26	8.15	13.10	18.72
1	2.79	3.56	3.49	3.97	2.36	3.21	3.13	3.59	5.99	4.32	8.21	13.17	18.77
2	2.82	3.58	3.53	4.00	2.40	3.24	3.16	3.61	5.98	4.35	8.24	13.20	18.79
3	2.86	3.60	3.57	4.02	2.43	3.26	3.19	3.63	5.98	4.38	8.27	13.23	18.80
4	2.89	3.61	3.60	4.04	2.47	3.29	3.22	3.65	5.97	4.41	8.30	13.26	18.82
5	2.92	3.62	3.63	4.06	2.50	3.32	3.24	3.67	5.97	4.43	8.32	13.28	18.84
6	2.95	3.64	3.66	4.08	2.52	3.34	3.27	3.68	5.96	4.46	8.35	13.31	18.85
7	2.97	3.65	3.68	4.10	2.55	3.36	3.29	3.70	5.96	4.48	8.37	13.33	18.86
8	2.99	3.66	3.71	4.11	2.57	3.38	3.32	3.71	5.95	4.50	8.39	13.35	18.87
9	3.01	3.67	3.73	4.13	2.60	3.40	3.34	3.72	5.95	4.52	8.41	13.36	18.88
10	3.03	3.68	3.75	4.14	2.62	3.42	3.36	3.74	5.94	4.54	8.43	13.38	18.89
11	3.05	3.69	3.77	4.16	2.64	3.44	3.38	3.75	5.94	4.56	8.44	13.40	18.90
12	3.07	3.69	3.79	4.17	2.65	3.46	3.40	3.76	5.94	4.57	8.46	13.41	18.91
13	3.09	3.70	3.81	4.18	2.67	3.48	3.42	3.77	5.93	4.59	8.47	13.42	18.91
14	3.10	3.71	3.82	4.19	2.69	3.49	3.43	3.78	5.93	4.60	8.49	13.43	18.92
15	3.12	3.71	3.84	4.20	2.70	3.51	3.45	3.79	5.93	4.62	8.50	13.44	18.92
16	3.13	3.72	3.85	4.21	2.72	3.52	3.46	3.80	5.93	4.63	8.51	13.45	18.93
17	3.14	3.73	3.87	4.22	2.73	3.54	3.48	3.81	5.92	4.65	8.53	13.46	18.93
18	3.16	3.73	3.88	4.23	2.74	3.55	3.49	3.82	5.92	4.66	8.54	13.47	18.94
19	3.17	3.74	3.89	4.24	2.76	3.56	3.51	3.83	5.92	4.67	8.55	13.48	18.94
20	3.18	3.74	3.90	4.25	2.77	3.58	3.52	3.84	5.92	4.68	8.56	13.48	18.94
21	3.19	3.75	3.91	4.25	2.78	3.59	3.53	3.85	5.92	4.69	8.57	13.49	18.94
22	3.20	3.75	3.93	4.26	2.79	3.60	3.55	3.85	5.91	4.71	8.57	13.50	18.95
23	3.21	3.75	3.94	4.27	2.80	3.61	3.56	3.86	5.91	4.72	8.58	13.50	18.95
24	3.22	3.76	3.95	4.27	2.81	3.62	3.57	3.87	5.91	4.73	8.59	13.51	18.95
25	3.23	3.76	3.95	4.28	2.82	3.63	3.58	3.88	5.91	4.73	8.60	13.51	18.95

*The results when xp=0 were computed with a slightly different computer program. This program has not been reproduced anywhere in this study, but will be supplied upon request.

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