scheduled on a monthly basis, but this does not affect significantly the ratio of the two sums. Secondly, since the official projections of W_t and R_t were to be used in the computation of the annual tax per earner by equation (1) it was necessary to specify a starting year for the accumulation of the average tax. The year 1966 was chosen because it represented the inauguration of the current tax-benefit structure of the social security system.

Finally, the estimates of lifetime values of T and B under two alternative official cost projections were obtained for two or more specified values of each of several unmeasured variables affecting the estimate of T and B. The use of various assumed values provides some indication of the manner in which variations in the factors affect the T/B ratio and the yield on contributions. An attempt was made to encompass a plausible range in each of the following four variables: [25]

(1) The projected rate of growth of average real earnings was put alternatively at 2 percent and 3 percent. The past growth rates measured over relatively long periods appear generally to have fallen within this range. For example, one simple estimate shows a growth rate of 2.45 percent during the 1929–65 interval and 2.62 percent for 1947–65.[26]

(2) Two alternative sets of population and mortality projections developed by the Social Security Administration were also used. One set was prepared on "low-cost" (high birth rate and high mortality) assumptions and one on "high-cost" assumptions. The projected population with taxable earnings was taken to represent W_t. The projected number of aged beneficiaries was used as the measure of R_t.[27] The low-cost and high-cost projections of P_n are also deductibles from the official actuarial studies.[28]

(3) Another factor in the total tax accumulation is the age when work is begun. Even if all workers paid the average annual tax it would be necessary to distinguish between those starting early and those starting late. The taxes were accumulated from two alternative starting ages (and, therefore, for two different values of L). One earner was assumed to start work on his 18th birthday at the beginning of 1966 and pay the average tax over his working career; the other was assumed to start at age 22. Both were assumed to retire at age 65.

(4) The projected real rate of return was placed alternatively at 1.5, 3, 5, and 8 percent. A brief digression in support of this wide range of rates is probably in order. The objective was to allow for the great variation among rates of return available on different types of assets in recent decades. Chart 1 illustrates the contrast between the real yield

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[25] This numerical analysis approach was chosen, because the functional form of the T/B ratio appeared too complex for formal analysis. Under further simplifying assumptions discussed later this is not the case.

[26] These are based on a 1929–65 time series of average annual earnings per full-time worker deflated by the Consumer Price Index. (The average earnings series was obtained from *The National Income and Product Accounts of the United States,* supplement to the *Survey of Current Business,* 1966, pp. 106–109.) The estimated growth rates were obtained from a trend line fitted to the logarithms of the observations.

[27] These two projections are given in *Long-Range Cost Estimates for Old-Age, Survivors, and Disability Insurance System, 1966,* Actuarial Study No. 63 by the Office of the Actuary, Social Security Administration, tables 3 and 8. Projections were not available annually. The average tax was assumed to grow exponentially between the years tabulated.

[28] *United States Population Projections for OASDHI Cost Estimates,* actuarial study No. 62, by the Office of the Actuary, Social Security Administration, gives projected mortality rates which are assumed to have leveled off after the year 2000. These are given for age groups at 5-year intervals; they were interpolated to 1-year intervals, according to the pattern given in *U.S. Life Tables:* 1959–61, vol. 1, No. 1, U.S. Department of Health, Education, and Welfare, December 1964.