taxes are compounded and benefits are discounted.[8] In this section, alternative estimates of tax-benefit relationships that attend to these four considerations, are presented.

Tax-benefit ratios for the maximum earner are shown in table 1, and those for the average earner, in table 2. These workers are assumed to retire in 1966 after 29 years of work, from 1937 to 1965. The column headed "Taxes" lists the three assumptions regarding the shiftability of the employer tax. Ratios based on the no-backward shifting assumption are to be found in the row of figures called "Employee Taxes." Ratios based on the assumption that only one-half of the employer tax is shifted to the employee are registered in the row labeled "Employee Taxes plus 50 percent of Employer Taxes." Ratios based on the assumption of full-backward shifting are located in the row between the above two.

Total taxes are computed by—

$$T=\sum_{i=1}^{m} E_i t_i (1+r)^{m=i}$$

Where T = Sum of the compounded value of taxes paid from January 1, 1937 through December 31, 1965.
E_i = Taxable earnings i^{th} year.
t_i = Combined employee-employer tax rate in i^{th} year.
r = Assumed rate of interest = .03.
i = Index of years = 1, . . . , m.
m = Number of taxpaying years = 29.

These workers are assumed to receive benefits from 1966 to 1979. The columns headed "Benefits" suggest three possible family circumstances, each with different benefit amounts. For example, ratios for the worker who receives his retirement benefits are placed in the column headed "Employees' Retirement Benefits."

Total benefits for these workers are computed by—

$$B=\sum_{j=1}^{n} \frac{b_j}{(1+r)^j}$$

Where B = Sum of the discounted value (to 1965) of the expected benefits from January 1, 1966 through December 31, 1979.
b_j = Annual benefits of j^{th} year, determined by the average of the taxable earnings in the 10 years before retirement.
r = Assumed rate of interest = .03.
j = Index of years = 1. . . . , n.
n = Number of benefit-receiving years = 14.

[8] Price level changes need to be taken into consideration in tax-benefit ratios. With price inflation, the accumulated value of taxes (paid in the early period) may be understated if money magnitudes are used in compounding. Similarly, benefits, which are received in a late period, need to be discounted more, in the face of price inflation. For example, if the interest rate used is 3 percent, and if the price inflation rate is 2 percent, then the rate used in compounding and discounting becomes 5 percent when price inflation is considered. This rate is equal to the highest interest rate that savings and loan associations now offer. Some persons may prefer to use rates higher than 5 percent. Although the results based on higher interest rates are not included in the paper, calculations can easily be performed.