

years spent in the labor force, $m=a_2-a_1+1$, and (3) the rate of growth of population.³

Altogether, the social insurance tax rate, F , is determined by four variables or constants:

- p =the ratio of the pension to the wage
- n =the number of years people spend in retirement
- m =the number of years people spend in the labor force
- $t=1$ +the rate of growth of population.

It should be noted that the pay-as-you-go tax rate is not dependent on the level or rate of growth of wages. The whole operation of tax collection and pension payments may be assumed to occur within 1 year, so that we have no problem of payment lags.

Of the four factors affecting the social insurance tax rate, we might assume any three to be constant, and the fourth to be the main determinant of the tax rate. Thus, if we assume that the ratio of the pension to the wage, the number of years in the labor force and in retirement are constant, we can say that the pay-as-you-go tax rate depends on the rate of growth of population.⁴

THE INDIVIDUAL'S "ACTUARIAL" RATE

To turn from the aggregate point of view to the position of the individual, chart A-2 shows, with a constant wage level, the total amount of wages paid to an individual over his working life, area W (i.e., the rectangle $a_1a_2w_2w_1$). Similarly, the amount of pensions paid to an individual over his retirement years is represented by the area P (i.e., the rectangle $a_2a_3w_3w_2$).

If the interest rate were zero and he did not discount the future, the individual would have to save, or tax himself, at the rate

$$\frac{T}{W} = \frac{P}{W},$$

in order to provide himself for his old age (where T =total taxes paid, and P =total pensions received). The collective pay-as-you-go tax rate,

$$\frac{R}{L},$$

is necessarily less than the individual's required rate of saving,

$$\frac{T}{W},$$

³ The labor force, L , is the sum of the population in each age, a_1 to a_2 : $L=P(1+t+t^2+\dots+t^{m-1})$; where P is the oldest age group and Pt^{m-1} is the youngest age group in the labor force. Similarly, the retired population is the sum of the population in the ages a_2+1 to a_3 : $R=P(t^{-1}+t^{-2}+\dots+t^{-n})$ where Pt^{-1} is the youngest age group and Pt^{-n} is the oldest age group in the retired population. The social insurance tax rate, F , is determined by the ratio of the pension to the wage, p , and the ratio of retired to working population:

$$F=p\frac{R}{L}$$

⁴ For the next three decades in the United States, the population aged 65 and over bears an almost constant ratio to the population aged 20 to 64. This ratio rises from 18.1 percent in 1965 to about 19 percent in 2000. (*United States Population Projections for OASDI Cost Estimates*, Social Security Administration, Actuarial Study No. 62, Washington, D.C., December 1966, p. 23). Thus, it would be more realistic to say that the social insurance tax rate in the United States will depend upon the ratio of the pension to the average wage.