

of the pension to the wage and the number of years of working life and the number spent in retirement).

It might seem then that we have no problems of transition. It has been argued in most of the literature on this subject that under a pay-as-you-go system there is necessarily a large unfunded liability to be met during the transition to a mature system. Those who collect a full pension before contributing over a full lifetime receive a windfall.

It does not follow, however, that because of such windfalls, the younger age groups will pay a social insurance tax rate higher than their actuarial rate. The above analysis shows that the social insurance tax rate will be equal to the individual actuarial rate, for someone who works a lifetime under the system, where the interest rate is approximately equal to the sum of the rate of population growth and the rate of growth of wages. This will be true regardless of any unfunded liability. Here lies the paradox of social insurance. The younger age groups are taxed to provide for the aged, but the younger age groups also get an equivalent *quid pro quo* in the Government's promise to pay future benefits. At the same time, the aged receive windfalls. Is someone getting something for nothing—or without others having to give up something?

The answer to this paradox is to be found in the assumption of perpetual exponential growth.¹⁰ The point to be emphasized in considering social insurance financing is that the pay-as-you-go insurance rate cannot, on assumptions used above,¹¹ exceed the highest individual actuarial rate as long as the interest rate does not exceed the sum of the rate of growth of population and productivity.

The problem of unfunded liabilities is essentially this: Only the youngest age group in the population will be paying its full actuarial rate. All older age groups will pay a progressively lower rate, actuarially, down to the group just retiring when the system is instituted; and this group pays a zero price unless there are provisions for actuarially reduced benefits and minimum periods of coverage necessary to qualify for benefits.

In order to minimize this price discrimination, most social insurance systems do not immediately pay full benefits. But, neither do they postpone full benefits until the system reaches maturity. Because full benefits are not postponed until the system reaches maturity, most individuals will pay a social insurance tax rate below their own individual actuarial rate. This unfunded liability, however, cannot make the collective tax rate *exceed* the individual actuarial rate, even for those just entering the labor force.

INCOME REDISTRIBUTION

It may be concluded that the cause of current high social insurance tax rates (in relation to actuarial levels for young age groups earning

¹⁰ This assumption is the basis of certain get-something-for-nothing chain letter schemes. It was also the assumption underlying many fraternal insurance societies around the turn of the century. (Frank G. Dickinson, "The Social Security Principle," *The Journal of Insurance*, vol. 27, No. 4, December 1960, pp. 8-10.)

¹¹ One of these assumptions is that a free capital market exists and that private forms of savings are available to the individual. It was also assumed that the social insurance system would have no effect on the interest rate. In the extreme case, the Government could continue to raise its promise to pay until the pension was several times as large as the wage. If the tax rate rose to 100 percent, the rate of interest (and discount) would presumably be infinite.