

SOLVENCY CONSTRAINTS

$$r(t) \sum_{k=1}^g y(t, k) = V(t), \quad (t=1, 2, \dots, T). \quad (4.4)$$

SOCIAL ADEQUACY CONSTRAINTS

For each t , $1 \leq t \leq T$, we require

$$V(t) (\geq N(t)). \quad (4.5)$$

The simplicity of this set of constraints is somewhat deceptive. $N(t)$ is defined as the minimum lump-sum benefit sufficient to support socially adequate retirement income for all members of the cohort at time t . Thus $N(t)$ is the result of solving an actuarial problem that is constrained by a given policy regarding redistribution within the cohort.

EQUITY CONSTRAINTS

Because the benefits paid in the first $g-1$ years of the timespan from year 1 to year T may involve obligations that were present at the beginning of the timespan, we shall treat these years separately. We let $0(1, x)$, ($x=1, 2, \dots, g$), represent an array of given constants that individually denote the present value at the beginning of year 1 of the financial obligation of the pension system to the cohort that is in its x th year in the work force during year 1. For each t , $1 \leq t \leq g-1$ we require

$$V(t) \geq 0(1, g-t+1) \alpha^t + \sum_{k=1}^t y(k, g-t+k) \alpha^{t-k} r(k). \quad (4.6)$$

The constant α used in (4.6) has, of course, the role of an interest rate. The determination of this rate is clearly a matter of social policy. The results of section III, as well as more general considerations, would suggest setting α at the percentage growth rate of total wage income.

For the cohorts that enter the work force during the timespan of our problem, we require that $V(t)$ should be no less than total contributions with interest. Thus, for each t , $g \leq t \leq T$, we require,

$$V(t) \geq \sum_{k=1}^g y(t-g+k, k) \alpha^{g-k} r(t-g+k). \quad (4.7)$$

TERMINAL CONDITION CONSTRAINT

The terminal condition constraint simply sets an upper limit on the present value at time T of payments to the social security system from cohorts that will retire after time T . This constraint represents the stability requirement in a limited sense. The constraint is a barrier to providing social security benefits in the present that are only consistent with increasing tax rates in the future or with a failure to honor equity constraints in the future.