tures are forgone, and one must then measure the returns in those alternative uses. If general fiscal policy permits the public investment to be financed by public borrowing, one must trace what private investments are forgone because of this particular Government claim in the capital market.

(d) Does the public investment preempt a private opportunity at the physical site, or in the same product market, or in utilizing a scarce natural resource? If there is preemption of private investment, an additional test must be performed to assure that the public investment is superior to the preempted private opportunity.

Let me add that I would not include the possibility of preemption of private opportunities in deriving the interest rate itself. It is really a side test that must be performed on a project-by-project basis.

Let me examine quickly what I think is a theoretically correct solution in an imperfect economy and then evaluate if practically it is a solution.

III. A THEORETICALLY CORRECT SOLUTION IN AN IMPERFECT MARKET ECONOMY

A theoretically correct solution to the problem of the choice of interest rate for public investment planning in an imperfect market economy is as follows:

(1) Identify the actual opportunities that are forgone and measure the flow of returns that would have been earned in the alternative use;

(2) Apply the social rate of time preference to derive the present value of the returns forgone in the alternative use;

(3) Undertake only those public investments which yield more present value per dollar of expenditure than the forgone alternatives.[1]

This formulation, which I sketched in my book, "Water Resource Development," translates into U.S. Government practice as follows:

(1) Apply the social time preference rate of interest in the valuation of projects; but

(2) Compute the benefit-cost ratio of the forgone opportunities in the private or public sector. If the interest rate is very low, if we assume the social time preference to be very low, the benefit-cost ratio of the forgone opportunities will be very high.

(3) Undertake those public projects which have a benefit-cost ratio greater than the benefit-cost ratio of the forgone opportunities. With an interest rate of 3 percent, they would nowadays come to a benefit-cost ratio on the order of 2.

While this formulation is correct within the particular theoretical model, and I had high hopes for it 10 years ago, there are serious difficulties in applying the method. It is my present judgment that a more workable approach must be developed. The faults are these:

(1) There is no generally agreed upon empirical basis for deriving the rate of social time preference. One can make plausible arguments in favor of high or low rates. When individuals have a chance to express their preferences about present versus future consumption they

[1] This formulation does not deal with the optimal time schedule of public investments, the physical or economic interdependence of projects, adjustments for risk, or the intricate question of the symmetrical treatment of taxation.