

EFFECT OF CHANGES IN DISCOUNT
RATES ON BENEFIT-COST RATIOS

The chart on page 6 shows the inverse relationship between discount rates (shown on the horizontal axis) and benefit-cost ratios (shown on the vertical axis) for three different programs which have constant annual benefits and constant annual operating costs. The three curves illustrate the effect of discounting on the benefit-cost ratios of the three hypothetical programs with differing lives, each of which, if undiscounted, would reflect a benefit-cost ratio of 2; that is, total undiscounted benefits for each program would be double the total undiscounted costs. With discounting, the favorable benefit-cost ratios deteriorate as higher discount rates are applied. For example, Program A has a benefit-cost ratio of about 1.7 at 3 percent, but only about 1.1 at 10 percent.

The curves drawn for these three hypothetical programs are probably typical of such curves for many programs; however, the curve for any particular program may be different because of the behavior of the program's benefits and costs. Such behavior would depend in part upon the assumed life of the program and the amount of initial investment cost relative to annual benefits and annual costs.

The chart on page 6 also illustrates that changes in the higher discount rates have less relative effect on benefit-cost ratios than do changes in the lower discount rates. Therefore, a greater absolute error or wider range of uncertainty or variation may be tolerated in the higher discount rates than in the lower discount rates. For example, an increase in the discount rate from 3 to 6 percent reduces the program B benefit-cost ratio by about 23 percent; whereas, an increase from 10 to 13 percent reduces the benefit-cost ratio by about 17 percent.