

PAYOUT PERIOD

The time to recover the tied-capital investment plus compounded interest on the total capital investment during the estimated life by means of the average annual cash flow is the payout period including interest.

Payout period including interest

$$= \frac{\text{depreciable fixed-capital investment} + \text{interest on total capital investment during estimated service life}}{(\text{avg profit/yr} + \text{avg depreciation/yr})_{\text{as constant annuity}}}$$

This method tends to increase the payout period above that found with no interest charge.

Determination of profitability index with continuous interest compounding and prestartup costs.

- ▣ Example 3 Determine the discounted-cash-flow rate of return (i.e., the profitability index) for the overall plant project described in the following:

- ▣ One year prior to startup of the plant, the necessary land is purchased at a cost of \$200,000.

During the year prior to the startup, the plant is under construction with money for the construction and related activities flowing out uniformly during the entire year starting at zero dollars and totaling \$600,000 for the year.

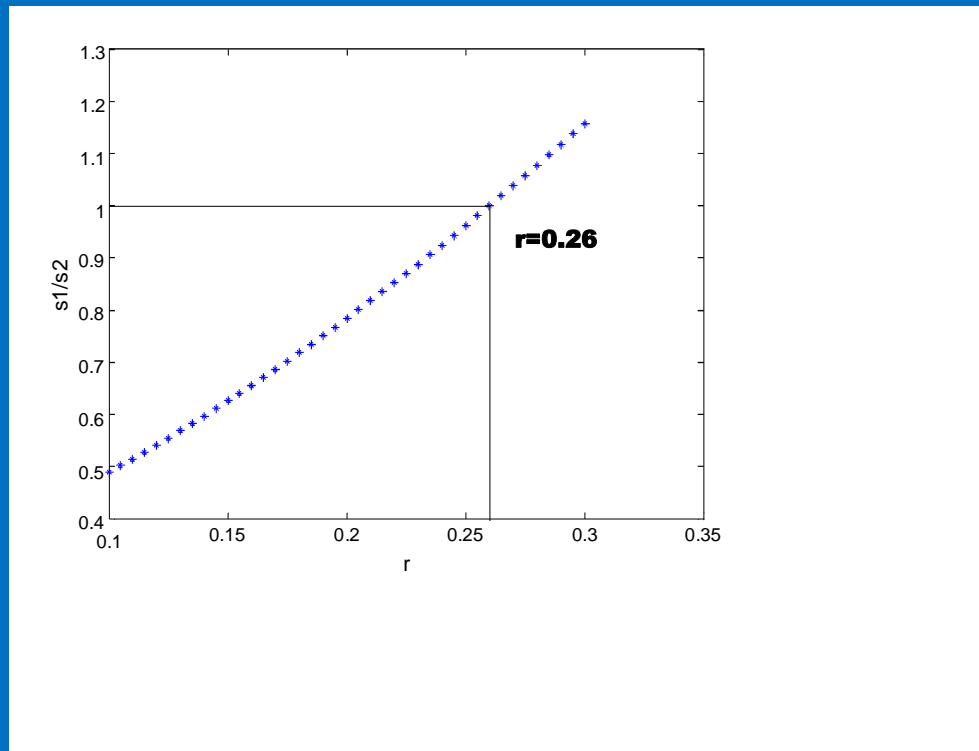
- ▣ A working-capital investment of \$200,000 is needed at the time the plant starts operation and must be retained indefinitely.

- ▣ Salvage value for the plant at the end of the estimated useful life is \$100,000. The estimated useful life is 10 years.

- ▣ Estimations of operating costs, income, and taxes indicate that the annual cash flow to the project (i.e., net profit plus depreciation per year) will be \$310,000 flowing uniformly throughout the estimated life. This is an after-tax figure.

The concept of continuous interest compounding and continuous cash flow will be used. Neglect any effects due to inflation or deflation.

Example 3



ALTERNATIVE INVESTMENTS

In industrial operations, it is often possible to produce equivalent products in different ways.

Although the physical results may be approximately the same, the capital required and the expenses involved can vary considerably depending on the particular method chosen.

It may be necessary not only to decide if a given business venture would be profitable, but also to decide which of several possible methods would be the most desirable.

ALTERNATIVE INVESTMENTS

A chemical company is considering adding a new production unit which will require a total investment of \$1,200,000 and will yield an annual profit of \$240,000.

An alternative addition has been proposed requiring an investment of \$2 million and yielding an annual profit of \$300,000.

ALTERNATIVE INVESTMENTS

Although both of these proposals are based on reliable estimates, the company executives feel that other equally sound investments can be made with at least a 14 percent annual rate of return.

Therefore, the minimum rate of return required for the new investment is 14 percent.

