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CAPITAL BUDGETING DECISIONS

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OUTLINE OF THE LECTURE

1. Capital budgeting
2. Cash flow versus net operating income
3. The time value of money
4. The payback method
5. The net present value method

CAPITAL BUDGETING

- the term **capital budgeting** is used to describe how managers plan significant investment in projects that have long-term implications such as the purchase of new equipment or the introduction of new products

- most companies have many more potential projects than can actually be funded

- hence, managers must carefully select those projects that promise the greatest future return

- how well managers make these capital budgeting decisions is a critical factor in the long-run financial health of the organization

TYPICAL CAPITAL BUDGETING DECISIONS (1)

- any decision that involves a cash outlay now in order to obtain a future return is a capital budgeting decision

- typical capital budgeting decisions include:
  - Cost reduction decisions.
    - Should new equipment be purchased to reduce costs?
  - Expansion decisions.
    - Should a new plant, warehouse, or other facility be acquired to increase capacity and sales?
  - Equipment selection decisions.
    - Which of several available machines should be purchased?
  - Lease or buy decisions.
    - Should new equipment be leased or purchased?
  - Equipment replacement decisions.
    - Should old equipment be replaced now or later?

TYPICAL CAPITAL BUDGETING DECISIONS (2)

- capital budgeting decisions fall into two broad categories - **screening decisions** and **preference decisions**

- **screening decisions** relate to whether a proposed project is acceptable - whether it passes a preset hurdle

  – for example, a company may have a policy of accepting projects only if they provide a return of a least 20% on the investment; the required rate of return is the minimum rate of return a project must yield to be acceptable

- **preference decisions**, by contrast, relate to selecting from among several acceptable alternatives

  – to illustrate, a company may be considering several different machines to replace an existing machine on the assembly line; the choice of which machine to purchase is a preference decision

CASH FLOW VERSUS NET OPERATING INCOME (1)

Typical cash outflows

- most projects have at least three types of cash outflows
- first, they often require an immediate cash outflow in the form of an initial investment in equipment, other assets, and installation costs
- any salvage value realized from the sale of old equipment can be recognized as a reduction in the initial investment or as a cash inflow
- second, some projects require a company to expand its **working capital**

CASH FLOW VERSUS NET OPERATING INCOME (2)

Working capital

- working capital is current assets (cash, accounts receivable, and inventory) less current liabilities
- when a company takes on a new project, the balances in the current asset accounts often increase
- for example, opening a new Nordstrom s department store requires additional cash in sales registers and more inventory
- these additional working capital needs are treated as part of the initial investment in a project
  - many projects require periodic outlays for repairs and maintenance and additional operating costs

CASH FLOW VERSUS NET OPERATING INCOME (3)

Typical cash inflows

- most projects also have at least three types of cash inflows
  - first, a project will normally increase revenue or reduce costs; the amount involved should be treated as a cash inflow for capital budgeting purposes; from a cash flow standpoint, a reduction in costs is equivalent to an increase in revenues
  - second, cash inflows are also frequently realized from selling equipment for its salvage value when a project ends, although the company may actually have to pay to dispose of some low-value or hazardous items
  - third, any working capital that was tied up in the project can be released for use elsewhere at the end of the project and should be treated as a cash inflow at that time; working capital is released, for example, when a company sells off its inventory or collects its accounts receivable

THE TIME VALUE OF MONEY (1)

- the time value of money recognizes that a dollar today is worth more than a dollar a year from now if for no other reason than you could put the dollar in a bank today and have more than a dollar a year from now

- because of the time value of money, capital investments that promise earlier cash flows are preferable to those that promise later cash flows

- although the payback method focuses on cash flows,s it does not recognize the time value of money

- in other words, it treats a dollar received today as being of equal value to a dollar received at any point in the future

THE TIME VALUE OF MONEY (2)

- conversely, the net present value and internal rate of return methods not only focus on cash flows, but they also recognize the time value of those cash flows

- these two methods use a technique called discounting cash flows to translate the value of future cash flows to their lesser present value

THE PAYBACK METHOD (1)

- the payback method of evaluating capital budgeting projects focuses on the payback period
- the payback period is the length of time that it takes for a project to recover its initial cost from the net cash inflows that it generates
- this period is sometimes referred to as the time that it takes for an investment to pay for itself
- the basic premise of the payback method is that the more quickly the cost of an investment can be recovered, the more desirable is the investment

THE PAYBACK METHOD (2)

- the payback period is expressed in years
- when the annual net cash inflow is the same every year, the following formula can be used to compute the payback period
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$$\text{Payback period} = \frac{\text{Investment required}}{\text{Annual net cash inflow}}$$

EVALUATION OF THE PAYBACK METHOD (1)

- the payback method is not a true measure of the profitability of an investment
- rather, it simply tells a manager how many years are required to recover the original investment
- unfortunately, a shorter payback period does not always mean that one investment is more desirable than another
- a further criticism of the payback method is that it does not consider the time value of money
- a cash inflow to be received several years in the future is weighed the same as a cash inflow received right now

EVALUATION OF THE PAYBACK METHOD (2)

- on the other hand, under certain conditions the payback method can be very useful
- for one thing, it can help identify which investment proposals are in the ballpark
- that is, it can be used as a screening tool to help answer the question - Should I consider this proposal further?
- if a proposal doesnt t provide a payback within some specified period, then there may be no need to consider it further
- in addition, the payback period is often important to new companies that are cash poor

EVALUATION OF THE PAYBACK METHOD (3)

- when a company is cash poor, a project with a short payback period but a low rate of return might be preferred over another project with a high rate of return but a long payback period

- the reason is that the company may simply need a faster return of its cash investment

- the payback method is sometimes used in industries where products become obsolete very rapidly - such as consumer electronics; because products may last only a year or two, the payback period on investments must be very short

PAYBACK AND UNEVEN CASH FLOWS

- when the cash flows associated with an investment project change from year to year, the simple payback formula that we outlined earlier cannot be used

- instead, the payoff period can be computed as follows:

Payback period = Number of years up to the year in which the investment is paid off + (Unrecovered investment at the beginning of the year in which the investment it paid off Cash inflow in the period in which the investment is paid off)

THE NET PRESENT VALUE METHOD (1)

- the net present value method and the internal rate of return method use discounted cash flows to analyze capital budgeting decisions
- the net present value method compares the present value of a project s cash inflows to the present value of its cash outflows
- the difference between the present value of these cash flows, called the net present value, determines whether or not a project is an acceptable investment
- when performing net present value analysis, managers usually make two important assumptions
- first, they assume that all cash flows other than the initial investment occur at the end of periods

THE NET PRESENT VALUE METHOD (2)

- this assumption is somewhat unrealistic because cash flows typically occur throughout a period rather than just at its end; however, it simplifies the computations considerably

- second, managers assume that all cash flows generated by an investment project are immediately reinvested at a rate of return equal to the rate used to discount the future cash flows, also known as **the discount rate**

- it this condition is not met, the net present value computations will not be accurate

THE NET PRESENT VALUE METHOD (3)

- to improve your understanding of the minimum required rate of return, it bears emphasizing that a company s cost of capital is usually regarded as its minimum required rate of return

- **the cost of capital** is the average rate of return that the company must pay to its long-term creditors and its shareholders for the use of their funds

- if a project s rate of return is less than the cost of capital, the company does not earn enough to compensate its creditors and shareholders

- therefore, any project with a rate of return less than the cost of capital should be rejected; the cost of capital serves as a screening device

THE NET PRESENT VALUE METHOD (4)

- when the cost of capital is used as the discount rate in net present value analysis, any project with a negative net present value does not cover the company s cost of capital and should be discarded as unacceptable

- the net present value method automatically provides for return of the original investment

- whenever the net present value of a project is positive, the project will recover the original cost of the investment plus sufficient excess cash inflows to compensate the organization for tying up funds in the project

THE INTERNAL RATE OF RETURN METHOD (1)

- **the internal rate of return** is the rate of return of an investment project over its useful life
- the internal rate of return is computed by finding the discount rate that equates the present value of a project s cash outflows with the present value of its cash inflows
- in other words, the internal rate of return is the discount rate that results in a net present value of zero
- to compute the internal rate of return of the new mower, we must find the discount rate that will result in a zero net present value
  - the simplest and most direct approach when the net cash inflow is the same every year is to divide the investment in the project by the expected annual net cash inflow

THE INTERNAL RATE OF RETURN METHOD (2)

- this computation yields a factor from which the internal rate of return can be determined

$$\textit{Factor of the internal rate of return} = \frac{\textit{Investment required}}{\textit{Annual net cash inflow}}$$

COMPARISON OF THE NET PRESENT VALUE AND INTERNAL RATE OF RETURN METHODS (1)

- this slide compares the net present value and internal rate of return methods in three ways

- 1. Both method use the cost of capital to screen out undesirable investment projects. When the internal rate of return method is used, the cost of capital is used as the hurdle rate that a project must clear for acceptance.

- 2. The net present value method is often simpler to use than the internal rate or return method, particularly when a project does not have identical cash flows every year.

COMPARISON OF THE NET PRESENT VALUE AND INTERNAL RATE OF RETURN METHODS (2)

- 3. The internal rate of return method makes a questionable assumption. Both methods assume that cash flows generated by a project during its useful life are immediately reinvested elsewhere. The net present value method assumes the rate of return is the discount rate, whereas the internal rate of return method assumes the rate of return earned on cash flows is the internal rate of return on the project.

EXPANDING THE NET PRESENT VALUE METHOD

- the total cost approach to explain how the net present value method can be used to evaluate two alternative projects
- the total-cost approach is the most flexible method for comparing competing projects.

LEAST-COST DECISIONS

- some decisions do not involve any revenues
- for example, a company may be trying to decide whether to buy or lease an executive jet
- the choice would be made on the basis of which alternative - buying or leasing - would be least costly
- in situation such as there, where no revenues are involved, the most desirable alternative is the one with the least total cost from a present value perspective
- hence, these are known as **least-cost decision**

INTERNAL RATE OF RETURN METHOD

- when using the internal rate of return method to rank competing investment projects, the preference rule is: ***this higher the internal rate of return, the more desirable the project***

- an investment project with an internal rate of return of 18% is usually considered preferable to another project that has a return of only 15%

- internal rate of return is widely used to rank projects

NET PRESENT VALUE METHOD (1)

- the net present value of one project cannot be directly compared to the net present value of another project unless the initial investments are equal

- **project profitability index:**

$$\textit{Project profitability index} = \frac{\textit{Net present value of the project}}{\textit{Investment required}}$$

- when using the project profitability index to rank competing investments projects, the preference rule is: this higher the project profitability index, the more desirable the project

- the project profitability index is an application of the techniques for utilizing constrained resources

NET PRESENT VALUE METHOD (2)

- a few details should be clarified with respect to the computation of the project profitability index
- the investment required refers to any cash outflows that occur at the beginning of the project, reduced by any salvage value recovered from the sale of old equipment
- the investment required also includes any investment in working capital that the project may need

THE SIMPLE RATE OF RETURN METHOD (1)

- the simple rate of return method is the final capital budgeting technique
- this method is also often referred to as the accounting rate of return or the unadjusted rate of return
- to obtain the simple rate of return, the annual incremental net operating income generated by a project is divided by the initial investment in the project

$$\textit{Simple rate of return} = \frac{\textit{Annual incremental net operating income}}{\textit{Initial investment}}$$

THE SIMPLE RATE OF RETURN METHOD (2)

- the annual incremental net operating income included in the numerator should be reduced by the depreciation charges that result from making the investment

- furthermore, the initial investment shown in the denominator should be reduced by any salvage value realized from the sale of old equipment

POST AUDIT OF INVESTMENT PROJECTS

- after an investment project has been approved and implemented, a post audit should be conducted

- a post audit involves checking whether or not expected results are actually realized

- this is a key part of the capital budgeting process because it helps keep managers honest in their investment proposal
- the data used in the post audit analysis should be **actual observed data** rather than estimated data