Chapter 11
The Basics of Capital Budgeting

We will use the following two projects in our discussion of capital budgeting tools. Assume a cost of capital of 10%.

<table>
<thead>
<tr>
<th>Year</th>
<th>Project S</th>
<th>Project L</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>-$1,000</td>
<td>-$1,000</td>
</tr>
<tr>
<td>1</td>
<td>500</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>400</td>
<td>300</td>
</tr>
<tr>
<td>3</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>600</td>
</tr>
</tbody>
</table>

CAPITAL BUDGETING TOOLS
1. Payback Rule—the expected number of years required to recover a project’s cost. Determine the payback for projects S and L.
   a. accept/reject criterion
   b. advantages/disadvantages of payback
   c. Discounted payback rule—similar to payback except that discounted (at the cost of capital) cash flows are used

2. Net Present Value—the sum of the present values of a project’s cash flows. Determine the net present value for projects S and L.
   a. accept/reject criterion
   b. If a project has NPV=0, then the project generates exactly enough cash flows to recover the cost of the investment and to enable investors to earn their required rates of return. If NPV > 0, then more than enough cash flows are generated.…
   c. NPV is dependent on the cost of capital used

3. The Internal Rate of Return—the discount rate that forces the NPV of a project to equal zero. Determine the IRR for projects S and L.
   a. accept/reject criterion
   b. IRR measures a project’s profitability in the rate of return sense: if a project’s IRR equals its cost of capital, then its cash flows are just sufficient to provide investors with their required rate of return. IRR > cost of capital implies an economic profit that will accrue to the firm’s shareholders while and IRR < cost of capital indicates an economic loss—or the project will not earn enough to cover its cost of capital.
   c. IRRs are independent of the cost of capital; however, the acceptability of the projects are dependent on the cost of capital.
   d. Nonconventional cash flows—multiple IRRs—see Figure 11-3 page 345.
   e. Mutually exclusive investments

4. Net Present Value Profiles
   a. NPV profiles are curves rather than straight lines
   b. Y-intercept is the project’s NPV when the cost of capital is 0%
   c. X-intercept is the project’s IRR (when NPV = 0)
   d. The cross-over point is determined by the IRR of the differences in cash flows
   I. For an independent project, NPV and IRR lead to the same accept/reject decision
   II. IRR and NPV may conflict for mutually projects depending on the cost of capital

5. Modified Internal Rate of Return (MIRR)—the discount rate at which the present value of a project’s cost is equal to the present value of the terminal value, found by compounding the cash inflows at the cost of capital
   a. accept/reject criterion
   b. better than IRR due to reinvestment rate assumption and since there is only one MIRR (as opposed to the potential for multiple IRRs)
6. Reinvestment rate assumptions: NPV, IRR, and MIRR are found by discounting cash flow. Inherent in the NPV calculation is the assumption that cash flows can be reinvested at the project’s cost of capital, while the IRR calculation assumes reinvestment at the IRR. Which reinvestment assumption is better?

- For independent projects, the NPV, IRR, and MIRR always reach the same accept/reject conclusion; so the three criteria are equally good when evaluating independent projects.
- If projects are mutually exclusive and they differ in size, NPV is best because it selects the project that maximizes value.
- Overall, MIRR is superior to the regular IRR as an indicator of a project’s “true” rate of return but NPV is better than IRR and MIRR when choosing among competing projects.