LEARNING OBJECTIVES

- Explain how capital budgeting incorporates the time value of money into multiyear analysis
- Describe the five stages of capital budgeting for a project
- Use and evaluate the two main discounted cash flow (DCF) methods: the net present value (NPV) method and the internal rate-of-return (IRR) method
LEARNING OBJECTIVES

• Evaluate the sensitivity of net present value calculations to assumed cash flows and required rate of return
• Use and evaluate the payback method
• Use and evaluate the accrual accounting rate-of-return (AARR) method

LEARNING OBJECTIVES

• Identify and reduce conflicts from using DCF for capital budgeting decisions and accrual accounting for performance evaluation
• Identify relevant cash inflows and outflows for capital budgeting decisions
• Explain how strategic issues influence the capital budgeting process.

LEARNING OBJECTIVES

• Design an accounting-based performance measure
• Analyse return on investment (ROI) using the DuPont method
• Use the residual-income (RI) measure and explain its advantages
• Use the economic value added (EVA®) method to evaluate performance
• Contrast the strengths and weaknesses of current-cost and historical-cost asset-measurement methods
• Describe the four levers of control and explain why each lever is important.
Two dimensions of cost analysis

- The two dimensions are:
  - Horizontally across, as the project dimension.
  - Vertically upward, as the accounting-period dimension.
- Each project is represented as a horizontal rectangle starting and ending at different times, which often span across accounting periods.
- The vertical rectangle represents the dimension of income determination and routine annual planning and control that cuts across all projects that are ongoing that year.

Stages of capital budgeting

- Capital budgeting is making long-run planning decisions for investing in projects.
- Capital budgeting is a decision-making and control tool that spans multiple years.
Capital budgeting process:
- Identify potential capital investments that agree with the organisation’s strategy
- Gather information from all parts of the value chain to evaluate alternative projects
- Forecast all potential cash flows attributable to the alternative projects

Stages of capital budgeting
- Determine which investment yields the greatest benefit and the least cost to the organisation
- Implement the decision
- Obtain funding and make the investments selected in stage 4
- Track realised cash flows, compare against estimated numbers and revise plans if necessary.

Four capital budgeting methods used to analyse financial information are:
- Net Present Value (NPV)
- Internal Rate of Return (IRR)
- Payback Period
- Accrual Accounting Rate Of Return (AARR).
Stages of capital budgeting – web links

• "The basic steps of capital budgeting' with links to other aspects of this topic can be found at: http://www.finweb.com/financial-planning/the-basic-steps-of-capital-budgeting.html


Discounted cash flow

• Discounted cash flow (DCF) methods measure all expected future cash inflows and outflows of a project as if they occurred at a single point in time.
• The key feature of DCF methods is the time value of money, which means that a dollar received today is worth more than a dollar received in the future.
• DCF methods use the Required Rate of Return (RRR), which is the minimum acceptable annual rate of return on an investment.
• RRR is the return that an organisation could expect to receive elsewhere for an investment of comparable risk.
• RRR is also called the discount rate, hurdle rate, cost of capital, or opportunity cost of capital.

Net present value method

• The net present value (NPV) method calculates the expected change in wealth for shareholders from a project by discounting all expected future cash inflows and outflows back to the present point in time using the RRR.
• Based on financial factors alone only projects with a zero or positive NPV are acceptable.
To use the **NPV** method, apply the following three steps:

- **Draw a sketch of the relevant cash inflows and outflows**
- **Discount the cash flows using the correct compound interest table (or a calculator or spreadsheet) from the appendix and sum them,** i.e., **Convert the inflows and outflows into present value figures**
- **Make the project decision on the basis of the calculated **NPV**. Positive or zero **NPV** signals acceptance; negative **NPV** signals rejection.

---

**Internal rate-of-return method**

- **The internal rate-of-return (IRR) method calculates the discount rate at which the present value of all expected cash inflows from a project equals the present value of its expected cash outflows. That is, the IRR is the discount rate that makes NPV = 0.**
- **A project is accepted only if the IRR equals or exceeds the RRR.**
• Analysts use a calculator or computer program to provide the IRR trial-and-error approach:
  • Use a discount rate and calculate the project's NPV (the goal is to find the discount rate for which NPV = 0)
    • if the calculated NPV is greater than zero, use a higher discount rate
    • if the calculated NPV is less than zero, use a lower discount rate
    • continue until NPV = 0.

Discounted cash flow

Comparison of net present value and internal rate-of-return methods:
  • theoretically, NPV is the preferred method
  • IRR is widely used
  • NPV can be used with varying RRR
  • NPV of projects may be combined for evaluation purposes, IRR cannot
  • both may be used with sensitivity analysis (‘what-if’ analysis).
Sensitivity analysis

Discounted cash flow – web links

- ‘Discounted cash flow analysis’ explained with examples can be found at: http://i.investopedia.com/in/pdf/tutorials/dfca.pdf

- ‘Discounted cash flow calculator’ can be found at: http://www.creativeacademics.com/finance/dcf.html

Discounted cash flow – web links

- ‘Internal Rate of Return – A Capital Budgeting Decision Method’ with links to the other methods of analysis can be found at: http://bizfinance.about.com/od/Capital-Budgeting/a/internal-rate-of-return.htm

- ‘The Net Present Value Rule in Comparison to the Payback and Internal Rate of Return Methods’ discussion with examples of each method can be found at: http://university.akelius.de/library/pdf/the_net_present_sasc_ha_ruoof.pdf
Payback method

- Payback measures the time it will take to recoup, in the form of expected future cash flows, the net initial investment in a project.
- Shorter payback periods are preferable.
- Organisations choose a project payback period. The greater the risk, the shorter the payback period.
- The payback method is easy to understand.

Payback method

Uniform cash flows:
- With uniform cash flows the payback method highlights liquidity.

\[
\text{Payback period} = \frac{\text{Net initial investment}}{\text{Uniform increase in annual future cash flows}}
\]

Payback method

Non-uniform cash flows
- With non-uniform cash flows, the payback calculation takes a cumulative form: the cash flows over successive years are accumulated until the amount of net initial investment is recovered.
**Payback method – web link**

- “Payback method” with additional links can be found at: [http://www.accountingformanagement.org/payback-method/](http://www.accountingformanagement.org/payback-method/)

**Accrual accounting rate-of-return method**

- Accrual accounting rate-of-return (AARR) method divides an accrual accounting measure of average annual income of a project by an accrual accounting measure of its investment.
- It is also called the accounting rate of return.

**Accrual accounting rate-of-return method**

Prescribed text: Horngren 2nd ed.

\[
AARR = \frac{\text{Increase in expected average annual operating profit}}{\text{Not initial investment}}
\]

- Firms vary in how they calculate AARR
- Four of these methods:
  - Using Initial Investment as a Denominator
  - Using Average Investment as the Denominator
  - Using Average Book Value as the Denominator
  - Evaluating Cost Reduction Projects
In the above formula, the incremental net operating income is equal to incremental revenues to be generated by the asset less incremental operating expenses. The incremental operating expenses also include depreciation of the asset.

The denominator in the formula is the amount of investment initially required to purchase the asset. If an old asset is replaced with a new one, the amount of initial investment would be reduced by any proceeds realized from the sale of old equipment.

**Average accounting profit** is the arithmetic mean of accounting income expected to be earned during each year of the project’s life time.

Average investment may be calculated as the sum of the beginning and ending book value of the project divided by 2.

Where

\[
\text{Average Accounting Profit} = \frac{\text{Total accounting profit over the investment period}}{\text{Years of Investment}}
\]

\[
\text{Average Book Value} = \frac{\text{Initial Investment + Sinking Fund + Working Capital}}{\text{Years of Investment} + 1}
\]

Or

\[
\text{Average Book Value} = \frac{\text{Average Accounting Profit} \times \text{Years of Investment}}{100}
\]
Net Cost Savings. the amount of operating expenses and depreciation expenses, LESS, the sum total of the projected reduction in labour costs resulting from the use of new equipment.

The denominator in the formula is the amount of investment initially required to purchase the asset. If an old asset is replaced with a new one, the amount of initial investment would be reduced by any proceeds realized from the sale of old equipment.

AARR – Which one?

Depends on the analysis and what you need to compare with.

For any exam questions in this unit – use the text version of the formula.

AARR calculations are easy to understand, and they use numbers reported in financial statements.

AARR method does not track cash flows.

AARR method ignores time value of money.
• Some firms use **NPV** for capital budgeting decisions and a different method for evaluating performance.
• Managers may be tempted to make capital budgeting decisions on the basis of short-run accrual accounting results, even though that would not be in the best interests of the firm.

Evaluating managers and goal-congruence issues

Relevant cash flows in discounted cash flow analysis

• Relevant cash flows are the differences in expected future cash flows as a result of making an investment.
• Categories of cash flows include:
  - net initial investment
  - after-tax cash flow from operations
  - after-tax cash flow from terminal disposal of an asset and recovery of working capital.

Relevant cash flows in discounted cash flow analysis

• Relevant after-tax flows
• Using the concepts of differential cost and differential revenue, compare:
  - the after-tax cash outflows as a result of replacing the old asset, with
  - the additional after-tax cash inflows generated from using the new asset rather than the old asset.
Relevant cash flows in discounted cash flow analysis

- Categories of cash flows
- Three components to the initial investment:
  - initial machine investment
  - initial working capital investment
  - after-tax cash flow from current disposal of old machine.

Relevant cash flows in discounted cash flow analysis

Two components to cash flows from operations:
- inflows (after-tax) from producing and selling additional goods or services, or from savings in operating costs – excludes depreciation, which is handled below
- income tax cash savings from annual depreciation deductions.

Relevant cash flows in discounted cash flow analysis

Two components to terminal cash flow:
- after-tax cash flow from terminal disposal of asset (investment)
- after-tax cash flow from recovery of working capital (liquidating receivables and inventory once needed to support the project).
Relevant cash flows in discounted cash flow analysis

- YouTube lecture ‘Relevant cash flows for DCF’ can be found at: [http://www.youtube.com/watch?v=F59-fyggoYQ](http://www.youtube.com/watch?v=F59-fyggoYQ)
Managing the project

- Implementation and control:
  - Management of the investment activity itself
  - Management control of the project as a whole
- A post-investment audit may be done to provide management with feedback about the performance of a project, so that management can compare actual results to the costs and benefits expected at the time the project was selected.

Strategic considerations in capital budgeting

- A company's strategy is the source of its strategic capital budgeting decisions.
- Capital investment decisions that are strategic in nature require managers to consider a broad range of factors that may be difficult to estimate and/or quantify.

Customer value and capital budgeting

- The same framework used to evaluate investment projects can also be used to evaluate customers.
Investment in research and development
- Some firms regard R&D projects as important strategic investments, however:
  - the outcomes are very uncertain, and
  - the results can be far into the future.

Performance Measurement
- Shareholder value
  - Improving the worth of the business from the shareholders’ perspective
- Value-based management
  - Using shareholder value analysis to manage a business
  - A framework for making key business decisions that add economic value to the business
  - Consists of four aspects
  - Valuation, strategy, finance and corporate governance
Measures of shareholder value (cont.)

• Valuation
  • Discounted cash flows (DCF) are usually used to measure value
  • Future cash flows of the business are discounted taking into account the risk associated with those cash flows
  • Value drivers are the activities or actions that create value for a business
    • Include spread, growth, sustainability and cost of capital

Measures of shareholder value (cont.)

• Strategy
  • Has a substantial and continuing impact on the value of the business
• Finance
  • Financial policies will influence value creation
• Corporate governance
  • Involves selecting and implementing systems that contribute to value creation

Financial and non-financial performance measures

• Designing accounting-based performance measures requires six steps:
  • choose performance measures that align with top management’s financial goals
  • choose the time horizon of each performance measure
  • choose a definition of the components in each performance measure
  • choose a measurement alternative for each performance measure
  • choose a target level of performance
  • choose the timing of feedback.
Financial and non-financial performance measures

- Financial and non-financial performance measures
  - web links

Choosing among different performance measures: step 1
- Four common measures of economic performance:
  - Return on Investment
  - Residual Income
  - Economic Value Added
  - Return on Sales.
- Selecting subunit operating income as a measure is inappropriate since it obviously changes as the size of the subunits vary.
- Multiple approaches eg Kaplan’s “Balanced Score Card”

Choosing among different performance measures: step 1
Return on Investment:
- Return on Investment (ROI) is an accounting measure of income divided by an accounting measure of investment.

\[
\text{Return on investment} = \frac{\text{Income}}{\text{Investment}}
\]
Return on Investment is the most popular measure for two reasons:
- blends all the ingredients of profitability (revenues, costs, and investment) into a single percentage
- may be compared to other ROI's both inside and outside the firm.

It is also called the accounting rate of return (ARR) or the accrual accounting rate of return (AARR).

Choosing among different performance measures: step 1

ROI may be decomposed into its two components as follows:

ROI = \begin{bmatrix} Income \over Investment \\ Revenues \over Investment \end{bmatrix} = \begin{bmatrix} Income \over Revenues \\ Revenues \over Investment \end{bmatrix} \times \begin{bmatrix} Income \over Investment \end{bmatrix}

This is known as the DuPont method of profitability analysis:

An ROI Example

<table>
<thead>
<tr>
<th>Year</th>
<th>ABC Division</th>
<th>XYZ Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>Sales $20,000,000</td>
<td>Sales $120,000,000</td>
</tr>
<tr>
<td></td>
<td>Operating income 2,000,000</td>
<td>Operating income 5,000,000</td>
</tr>
<tr>
<td></td>
<td>Average operating assets 12,000,000</td>
<td>Average operating assets 35,000,000</td>
</tr>
<tr>
<td>1997</td>
<td>Sales $35,000,000</td>
<td>Sales $120,000,000</td>
</tr>
<tr>
<td></td>
<td>Operating income 2,500,000</td>
<td>Operating income 5,500,000</td>
</tr>
<tr>
<td></td>
<td>Average operating assets 12,000,000</td>
<td>Average operating assets 35,000,000</td>
</tr>
</tbody>
</table>

Minimum return of 10%
Margin and Turnover Comparisons

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Margin</td>
<td>10%</td>
<td>9.7%</td>
<td>8.4%</td>
<td>8.6%</td>
</tr>
<tr>
<td>Turnover</td>
<td>x 1.667</td>
<td>x 2.917</td>
<td>x 3.429</td>
<td>x 3.429</td>
</tr>
<tr>
<td>ROI</td>
<td>16.67%</td>
<td>20.71%</td>
<td>14.40%</td>
<td>15.77%</td>
</tr>
<tr>
<td>Annual ROI Increase</td>
<td>24%</td>
<td>1%</td>
<td>Refer to data slide</td>
<td></td>
</tr>
</tbody>
</table>

ABC - Reduced margin (-29%pa) offset by higher turnover
XYZ - Increased margin (9%pa) offset by static turnover

Advantages of ROI

✔ It encourages managers to focus on sales, expenses, and investments.
✔ It encourages cost efficiency.
✔ It discourages excessive investment in operating assets.

Disadvantages of the ROI measure

✘ It discourages managers from investing in projects that would decrease the divisional ROI but increase the profitability for the company as a whole.
✘ It encourages managers to focus on the short run at the expense of the long run.
Minimising the behavioural problems of ROI

- Use ROI as one of a series of performance measures that focus on both short-term and long-term performance
- Consider alternative ways of measuring invested capital to minimise dysfunctional decisions
- Use alternative financial measures, such as Residual Income or Economic Value Added

Residual Income:

- Residual income (RI) is an accounting measure of income minus a dollar amount for required return on an accounting measure of investment.
- Required rate of return times the investment is the imputed cost of the investment.
- Imputed costs are cost recognised in some situations, but not in the financial accounting records.

Choosing among different performance measures: step 1

Residual Income:

- Residual income (RI) = Income - (Required rate of return \times Investment)
- Required rate of return times the investment is the imputed cost of the investment.
- Imputed costs are cost recognised in some situations, but not in the financial accounting records.

A Residual Income Example

Residual Income = Operating income - (r \times Operating assets)
where r = The minimum rate of return

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating assets</td>
<td>$12,000,000</td>
<td>$12,000,000</td>
<td>$35,000,000</td>
<td>$35,000,000</td>
</tr>
<tr>
<td>Operating income</td>
<td>2,000,000</td>
<td>2,500,000</td>
<td>5,000,000</td>
<td>5,500,000</td>
</tr>
<tr>
<td>Minimum return</td>
<td>1,300,000</td>
<td>1,200,000</td>
<td>3,500,000</td>
<td>3,500,000</td>
</tr>
<tr>
<td>Residual income</td>
<td>$800,000</td>
<td>$1,300,000</td>
<td>$1,500,000</td>
<td>$2,000,000</td>
</tr>
</tbody>
</table>
Comparison of ROI and Residual Income Measures

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Return on Investment</td>
<td>16.67%</td>
<td>20.71%</td>
<td>14.40%</td>
<td>15.77%</td>
</tr>
<tr>
<td>Residual income</td>
<td>$800,000</td>
<td>$1,300,000</td>
<td>$1,500,000</td>
<td>$2,000,000</td>
</tr>
</tbody>
</table>

Which measure is best?

A major advantage of the residual income measure is that it discourages managers to consider ROI in evaluating investments. Like ROI, residual income encourages short run orientation. Residual income uses an absolute measure of profitability making direct comparison of profitability of divisions with different investment bases unfair since the level of investment may differ.

Features of the Residual Income Measure

- Economic Value Added (EVA®) is a specific type of residual income calculation that has recently gained popularity.
- Measure of the value created over a single accounting period.
- The spread between the return generated by the business activities and the cost of capital weighted average cost of capital equals the after-tax average cost of all long-term funds in use.

Choosing among different performance measures: step 1

Economic Value Added:

- Economic Value Added (EVA®) is a specific type of residual income calculation that has recently gained popularity.
- Measure of the value created over a single accounting period.
- The spread between the return generated by the business activities and the cost of capital weighted average cost of capital equals the after-tax average cost of all long-term funds in use.
Economic Value Added

Economic value added (EVA) = After-tax operating income less (Weighted cost of capital x Total capital employed)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>$12,000,000</td>
<td>$12,000,000</td>
<td>$35,000,000</td>
<td>$35,000,000</td>
</tr>
<tr>
<td>Income</td>
<td>2,000,000</td>
<td>2,500,000</td>
<td>5,000,000</td>
<td>5,500,000</td>
</tr>
<tr>
<td>Cost of Capital</td>
<td>4.8%</td>
<td>4.9%</td>
<td>5.1%</td>
<td>4.9%</td>
</tr>
<tr>
<td>EVA</td>
<td>$1,424,000</td>
<td>$1,912,000</td>
<td>$3,215,000</td>
<td>$3,785,000</td>
</tr>
</tbody>
</table>

Features of EVA Method

EVA is a registered trademark of Stern Stewart & Co.*

- **EVA** method employs
  - The **Weighted Average Cost of Capital** (ie includes the cost of all sources of capital used)
  - The **Total Cost of Capital used** (ie includes the cost of all capital used including those items that might otherwise been treated as expenses in GAAP)
- **EVA** is purely a management accounting technique
  - Not normal financial accounting technique

Advantages of EVA

- **EVA** links net income to capital employed
- By using actual cost of capital avoids use of accounting values which may or may not represent the true cost of capital
- (eg residual income uses a minimum expected rate of return and **ROI** calculates rate of return on historical cost)
Advantages of EVA

- It encourages managers to focus on sales, expenses, and the cost of the total investment required to achieve the net income.
- It encourages cost efficiency.
- Whilst discouraging excessive investment in operating assets.

Choosing among different performance measures: step 1

- **Return on Sales**: return on sales (ROS) is simply income divided by sales.
  - simple to calculate and widely understood.

Choosing among different performance measures: step 1

- Comparing performance measures:
  - **ROS** measures how effectively costs are managed.
  - **ROI, RI or EVA®** measures are more appropriate than ROS because they consider both income and investment.
  - **ROI** indicates which investment yields the highest return.
  - **RI and EVA®** measures overcome some of the goal-congruence problems of **ROI**.
Choosing among different performance measures — web links

- 'Residual Income' explained can be found at: http://accountingexplained.com/managerial/performance/residual-income
- Economic Value Added’ can be found at: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/favlinks/eva.htm
- Why EVA is better than ROI
- Implementing EVA
- Economic Value Added (EVA) for Small Business

Choosing the time period of the performance measures: step 2

- Multiple periods of evaluation are sometimes appropriate.
- ROI, RI, EVA® and ROS all basically evaluate one period of time.
- ROI, RI, EVA® and ROS may all be adapted to evaluate multiple periods of time.

Choosing alternative definitions for performance measures: step 3

- Four possible alternative definitions of investment:
  - Total Assets Available
    - Includes all assets, regardless of their intended purpose.
    - Investment centre manager is responsible for decisions about all assets
  - Investment centre managers retain, and are responsible for, non-productive assets.
  - Total Assets Employed
    - Performance is based on productive assets only. Idle assets are ignored.
  - Total Assets Employed Minus Current Liabilities
    - Investment centre is responsible for decisions about assets excluding those assets financed by short-term creditors.
  - Shareholder’s Equity
    - By reducing assets by the amount of financing includes only assets financed by shareholders.
  - Choice of average or end-of-year balances.
When designing accounting-based performance measures, the different ways to measure assets included in the investment calculations which must be considered are:

- Current Cost
- Gross Book Value (i.e. Historical Cost/Original Cost)
- Net Book Value (Original cost minus accumulated depreciation).

Choosing measurement alternatives for performance measures: step 4

Current Cost
- Current cost is the cost of purchasing an asset today that is identical to the one currently held, or, if an identical asset cannot be purchased, the cost of purchasing an asset that provides services like the one currently held.
- Measuring assets at current costs will result in different ROIs than the ROIs calculated on the basis of historical costs.

Asset measurement

Gross Book Value (i.e. Historical Cost/Original Cost)
- Advantages of acquisition cost
  - Choice of depreciation method is arbitrary and resulting carrying amount does not provide a reliable measure
  - Depreciating non-current assets may provide a disincentive to invest in new equipment
  - Proponents of gross book value claim that using it enables more accurate comparisons of ROI across subunits.
Asset measurement - ROI over time

<table>
<thead>
<tr>
<th>Year</th>
<th>Acquisition Cost</th>
<th>Depreciation</th>
<th>Year Profit before Depreciation</th>
<th>Average Carrying Amount</th>
<th>Replacement Cost**</th>
<th>ROI based on Carrying Amount</th>
<th>ROI based on Acquisition Cost</th>
<th>ROI based on Replacement Cost**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$150,000</td>
<td>$100,000</td>
<td>$50,000</td>
<td>$450,000</td>
<td>$500,000</td>
<td>11.10%</td>
<td>11.10%</td>
<td>11.10%</td>
</tr>
<tr>
<td>2</td>
<td>$150,000</td>
<td>$100,000</td>
<td>$50,000</td>
<td>$350,000</td>
<td>$500,000</td>
<td>14.30%</td>
<td>14.30%</td>
<td>14.30%</td>
</tr>
<tr>
<td>3</td>
<td>$150,000</td>
<td>$100,000</td>
<td>$50,000</td>
<td>$250,000</td>
<td>$500,000</td>
<td>20.00%</td>
<td>20.00%</td>
<td>20.00%</td>
</tr>
<tr>
<td>4</td>
<td>$150,000</td>
<td>$100,000</td>
<td>$50,000</td>
<td>$150,000</td>
<td>$500,000</td>
<td>33.30%</td>
<td>33.30%</td>
<td>33.30%</td>
</tr>
<tr>
<td>5</td>
<td>$150,000</td>
<td>$100,000</td>
<td>$50,000</td>
<td>$50,000</td>
<td>$500,000</td>
<td>100.00%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Average carrying amount is the average of the beginning and year-end balances. In year one for example, the average carrying amount is calculated by:

\[ \text{Average Carrying Amount} = \frac{\text{Beginning Carrying Amount} + \text{Ending Carrying Amount}}{2} \]

** Assumes simple inflation rate of 5%

Asset measurement

**Net Book Value**

- Advantages of carrying amount
  - Proponents of net book value claim that using this as an investment base is less confusing, because it is consistent with:
    - The amount of total assets shown in the conventional balance sheet
    - Income calculations that include deductions for depreciation expense.

Measuring profit

- Profit margin controllable by investment centre manager
  - Suitable when the focus is performance of the manager
  - Encourages managers to focus on profit that they can control
  - Motivational impact
- Profit margin attributable to investment centre
  - To calculate the investment centre ROI
Measuring profit

Historically driven targets are used to set target goals. Goals may include a continuous improvement component.

Choosing target levels of performance: step 5

Choosing the timing of feedback: step 6

Timing of feedback depends on:
- how critical the information is for the success of the organisation
- the specific level of management receiving the feedback
- the sophistication of the organisation’s information technology.
### Levers of Control

- **Diagnostic Control Systems**
- **Boundary Systems**
- **Belief Systems**
- **Interactive Control Systems.**

Each lever is important and needs to be monitored. Levers should be interdependent and collectively represent a living system of business conduct.

### Diagnostic Control Systems

Diagnostic control systems evaluate whether a firm is performing to expectations by monitoring and evaluating critical performance metrics including:

- ROI, RI, EVA®
- Customer satisfaction
- Employee satisfaction.

These must be balanced by the three other levers of control.

### Boundary Systems

Boundary systems describe standards of behaviour and codes of conduct expected of all employees.

- Boundary systems highlight actions that are ‘off-limits’.
- A code of conduct describes appropriate and inappropriate individual behaviours.
• Belief systems articulate the mission, purpose and core values of a company.
• They describe the accepted norms and patterns of behaviour expected of all managers and employees with respect to each other, shareholders, customers and communities.

Strategy and levers of control

• Interactive control systems are formal information systems that managers use to focus organisational attention and learning on key strategic issues.
• They track strategic uncertainties that businesses face.

Strategy and levers of control – web link

• Levers of Control: How Managers Use Innovative Control Systems to Drive Strategic Renewal can be found at: http://www.strategy-business.com/article/85537gko=27f6f
Discounted Cash Flow

- Discounted Cash Flow Calculations will not be examinable.
- You will need to know the concepts and apply the outcomes of the calculations but actual calculations will not be examined.
- Discounted Cash Flow Calculations are covered in another unit.

Weighted Avg. Cost of Capital Calculations

- Weighted Avg. Cost of Capital Calculations will not be examinable.
- You will need to know the concepts and apply the outcomes of the calculations but actual calculations will not be examined.
- However EVA Formula and EVA concepts may be examinable.

A Reasonable Capital Cost Rate (CCR)

\[
\text{CCR} = \frac{\frac{\text{Debt Cost}}{\text{Debt Proportion}} \times (1 - \text{Tax Rate}) + \text{Equity Cost} \times \text{Equity Proportion}}{\text{Debt Proportion} + \text{Equity Proportion}}
\]

Equity Cost = risk-free rate + equity risk premium
Debt Cost = risk-free rate + debt risk premium

The equity risk premium is adjusted with the company’s risk level.

The company’s risk level depends on the business risk (business field) and on the financial risk (solvency).
Economic value added (EVA) = After-tax operating income less (Weighted cost of capital x Total capital employed)

- After-tax operating income
  - Adjusted by adding back financing expenses (eg Interest Expense)
- Total capital employed
  - is Equity plus Total Liabilities less Non-Interest Bearing Liabilities (eg Accounts Payable and Accruals)