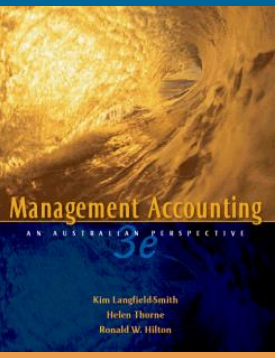
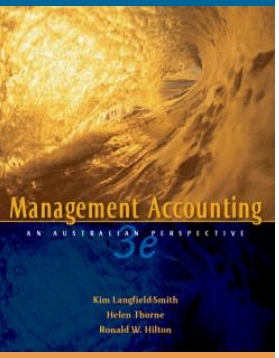


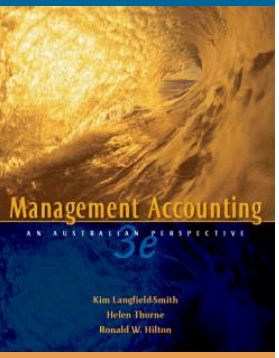
Chapter 20

Capital expenditure decisions: an introduction



Capital expenditure decisions

- Long-term decisions requiring the evaluation of cash inflows and outflows over several years to determine the acceptability of the project
- Significant impact on the competitiveness of the business
- Focus on specific projects and programs



The capital expenditure approval process

- Project generation
  - Often initiated by managers in business units
  - Consistent with strategic plan and corporate guidelines
- Evaluation and analysis of projected cash flows
  - Over the life of the project
  - Difficult to detect biases in estimates of cash flows

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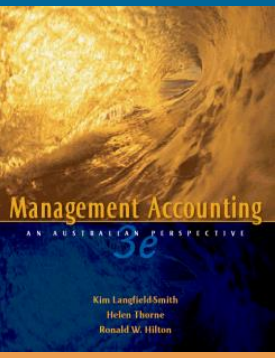

The capital expenditure approval process

- Progress to approval
  - The larger the project the high is the authority level for approval
  - A political process may take place due to strong competition for project approval
  - Initiators need to justify and 'sell' the project
- Analysis and selection of projects by senior management

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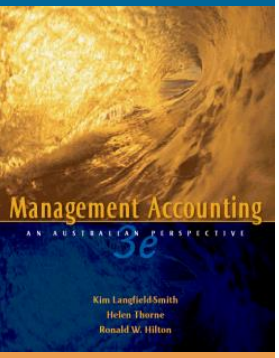
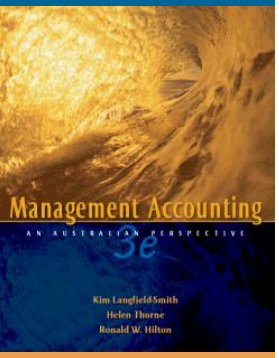


The capital expenditure approval process

- Implementation of projects
  - May involve the construction or purchase of new assets, staff training, new staff
- Post-completion audit of projects
  - A year or more after the project is implemented
  - Evaluation of accuracy of the initial plan and cash flows
  - Outcomes of the project



Techniques for analysing capital expenditure proposals

- Consider costs and benefits of the project
- Cash outflows
  - The initial cost of the project and operating costs over the life of the project
- Cash inflows
  - Cost savings and additional revenues and any proceeds of sale of assets that result from a project

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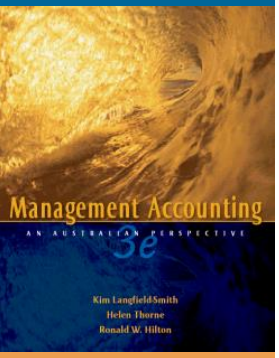


Techniques for analysing capital expenditure proposals

- Techniques
  - Payback method
  - Accounting rate of return
  - Discounted cash flow (DCF) techniques
- DCF techniques explicitly consider the time value of money

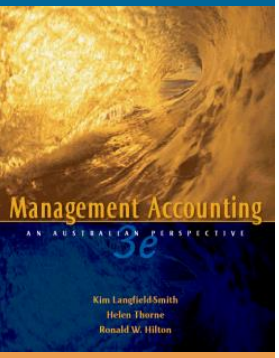
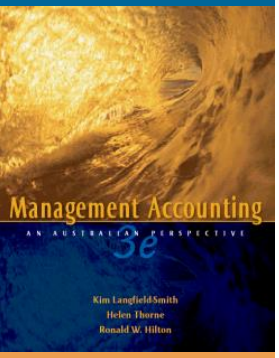


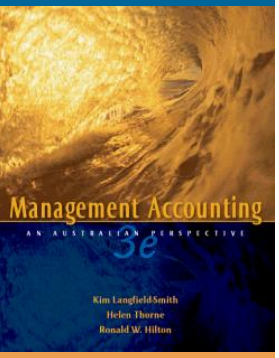
EXHIBIT 20.3 CT scanner: cash flows for the two alternatives, Monash Medical Centre

	Alternative One: Purchase an additional CT scanner	Alternative Two: Replace the current CT scanner
Initial investment (time 0)		
Acquisition cost	$(585 000)	$(676 000)
Installation	(74 715)	0
Proceeds of sale	0	150 000
Net investment (time 0)	**$(659 715)**	**$(526 000)**
Cash flow (years 1–5)		
Increase/savings in operating costs	$(107 000)	$63 000
Additional revenue due to increased capacity	90 000	0
Savings due to reduced stay of inpatients	200 000	80 000
Training for new machine (year 1)	0	(15 000)
Annual cost savings	**$183 000**	**$128 000**
	(Years 1–5)	(Year 1 only)
		$143 000
		(Years 2–5)



Discounted cash flow analysis

- A technique used in investment decisions to take account of the time value of money
- Makes future cash flows equivalent to those in the current year
- Types of DCF methods include
  - Net present value (NPV)
  - Internal rate of return (IRR)



Net present value method

- Calculates the present value of future cash flows of a project
- Steps
  - Determine cash flows for each year of the proposed investment
  - Calculate the net present value (NPV) of each cash flow using the *required rate of return*
  - Calculate the NPV in total
  - Project is acceptable on financial grounds if NPV is positive

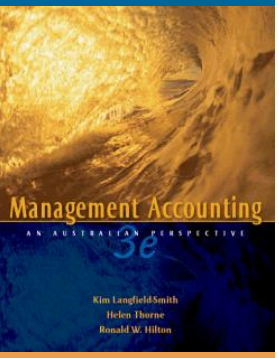
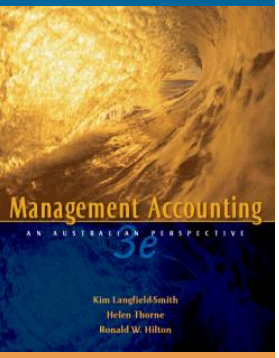


EXHIBIT 20.4 The net present value method: Alternative One—additional CT scanner, Monash Medical Centre

	Total present value	Present value of $1 at 10%*	Yearly cash flows 0	1	2	3	4	5
Initial investment	$(659 715)	1.000	$(651 000)					
Yearly cost savings/ additional revenue	166 347	0.909		$183 000				
	151 158	0.826			$183 000			
	137 433	0.751				$183 000		
	124 989	0.683					$183 000	
	113 643	0.621						$183 000
Total cost savings	$693 570							
Net present value	$33 855							

* Discount factors taken from Table 3 in Part 2 of the appendix.

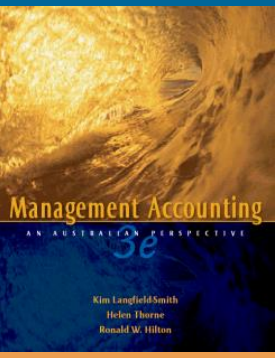


Internal rate of return (IRR) method

- Actual economic return earned by the project over its life
- The discount rate at which the NPV of the cash flows is equal to zero
- Can be determined manually or using a financial calculator or software

continued

Internal rate of return (IRR) method



$$p = \sum_{t=1}^{n} \frac{C_t}{(1+r)^n}$$

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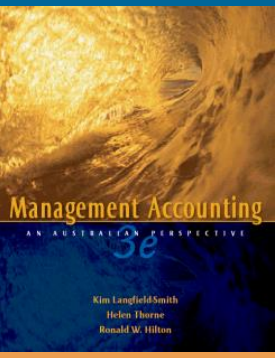
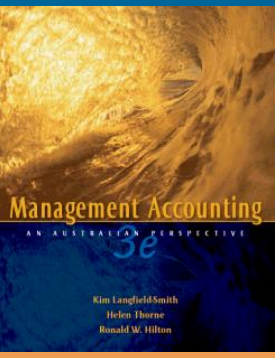


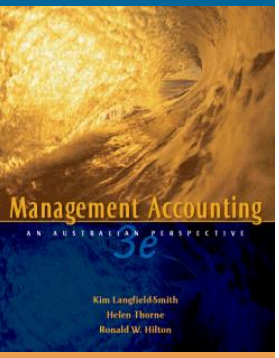
Internal rate of return (IRR) method

- Steps
  - Determine cash flows for each year of the proposed investment
  - Calculate the IRR
  - If IRR is greater than the required rate of return, the project is acceptable on financial grounds



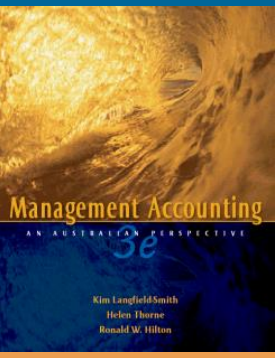
Comparing NPV and IRR methods

- NPV has many advantages over IRR
  - Easier to calculate manually
  - Adjustments for risk possible under NPV
  - NPV will always yield only one answer
  - NPV overcomes unrealistic *reinvestment assumption* required for IRR
- Reinvestment assumption
  - Cash flows available during the life of a project are assumed to be reinvested at the same rate as the project's rate of return.



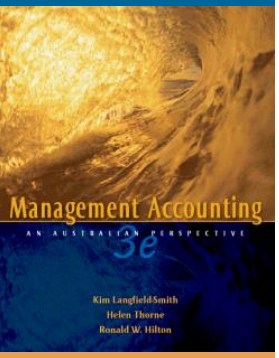
Assumptions underlying discounted cash flow analysis

- Two important assumptions
  - The year-end timing of cash flows
  - The certainty of cash flows
- Determining required rate of return
  - Usually based on the firm's weighted average cost of capital
  - Can be adjusted to take account of the risk of a particular project



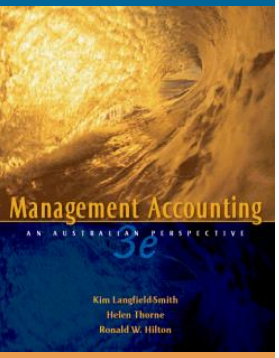
Least cost decisions

- Capital expenditure may be approved even when there is a negative NPV, or less than acceptable IRR
- Qualitative concerns may be driving the investment
- Select the course of action that has the *lowest cost*



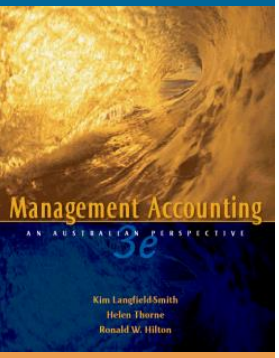
Depreciable assets

- NPV and IRR focus on cash flows
- Deprecation charges are not cash flows
- Where a business is liable for income taxes, depreciation is a tax deduction
- Reduction in taxation due to depreciation has cash flow implications



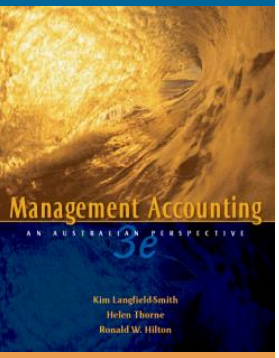
Comparing two alterative investment projects

- NPV and IRR may give different rankings for alternative projects
  - Due to reinvestment assumption of IRR
  - NPV results in correct ranking
- Strategic and competitive concerns must be considered in any decisiion



Other techniques for analysing capital expenditure projects

- Payback method
- Accounting rate of return
- These methods do not take account of the time value of money



Payback method

- The amount of time it will take for the cash inflows from the project to accumulate to cover the original investment
- Payback period
  - Initial investment / annual cash flow
- The simple formula will not work if a project has uneven cash flow patterns
  - Use cumulative cash flows

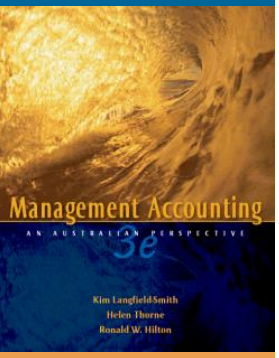
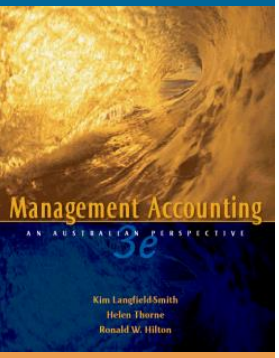


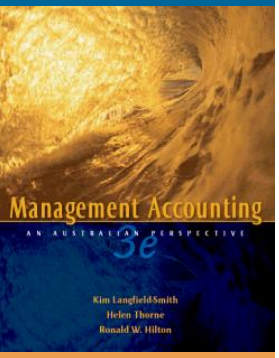
EXHIBIT 20.7 Payback period with uneven cash flows: Alternative Two—replace the CT scanner, Monash Medical Centre

Year	Cash flows	Accumulated cash flows at year-end	
0	$(526 000)	$(526 000)	
1	128 000	(398 000)	
2	143 000	(255 000)	
3	143 000	(112 000)	
4	143 000	31 000	← Payback period occurs during year 4
5	143 000	174 000	



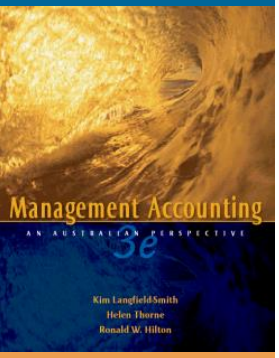
Payback: pros and cons

- Two drawbacks
  - Ignores the time value of money
  - Ignores cash flows beyond the payback period
- Widely used for several reasons
  - Simplicity
  - Useful for screening investment projects
  - Cash shortages may encourage short payback
  - Provides some insight as to the risk of a project



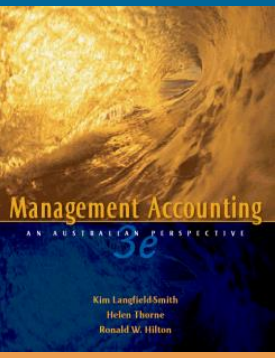
Accounting rate of return method

- Focuses on the incremental accounting profit that results from a project
- Accounting rate of return
  - Average annual profit from project / initial investment
- Accounting rate of return is effectively an average annual ROI for an individual project



Accounting rate of return: pros and cons

- Advantages of the accounting rate of return
  - Simple way to screen investment projects
  - Consistent with financial accounting methods
  - Consistent with profit-based performance evaluation
  - Considers the entire life of the project
- Major disadvantage
  - Ignores the time value of money



Accountant's role in capital expenditure analysis

- Provide accurate cash flow projects, considering…
  - Historical accounting data
  - Market conditions
  - Economic trends
  - Likely reactions of competitors

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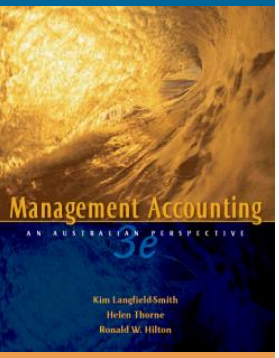
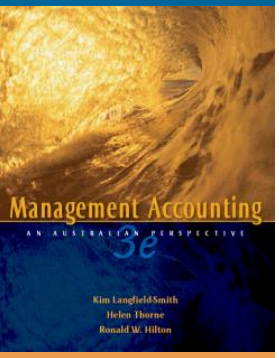


Accountant's role in capital expenditure analysis

- More accurate projections can be made by
  - Increasing the required rate of return to match the level of uncertainty
  - Sensitivity analysis
- Sensitivity analysis
  - To determine how much cash flow estimates would have to change for a decision not to be supported



Post-completion audits

- Reviews a past capital expenditure project by analysing the actual cash flows generated and comparing them with the expected cash flows
- Provides feedback on the accuracy of initial estimates, and help in the control of operations

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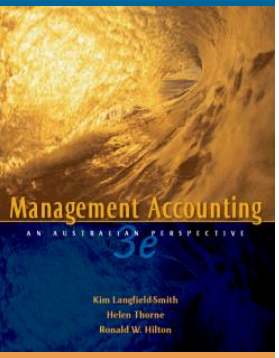
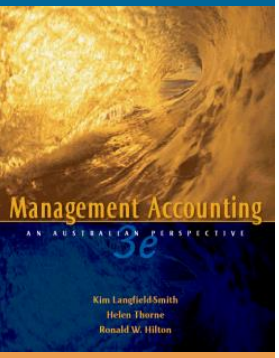


Post-completion audits

- Helps managers
  - Undertake periodic assessments of outcomes
  - Make adjustments where necessary
  - Control cash flow fluctuations
  - Assess rewards for those involved
  - Identify under-performing projects



Performance evaluation: a behavioural issue

- Potential conflict between criteria for evaluating individual projects and those used to evaluate the overall performance of managers
- A manger may reject a project with a positive NPV, when it will reduce divisional profits in early year of the project