

Accounting rate of return				
Total Net Cash inflow	A	17000		
Capital Outlay	B	-15000		
Total profit	C=A-B	2000		
Life (years)		5		
Average annual profit	C/D	400		
Accounting rate of return		$\frac{\text{Average annual profit}}{\text{Capital outlay}} \times 100$		
		$\frac{400}{15000} \times 100$		2.70%

Not using cash flows but **profits and calculated over project period**

some companies use the **average capital outlay** which leads to different results

Time required until outlay is paid back by cash flows

Capital outlay / Net cash inflow

Sometimes economic life important for consideration (might be that project which pays back after 3 of 5 years is more favourable than 2 of 2 years)

Easy to understand but time value of money ignored and not whole project life considered (flows after Payback period)

Accounting rate of return (ROI)

Discounting

From present value to future value = compounding
From future value to present value = discounting

Discounting and Compounding				
	Compound interest factors 10%	Discounted Cash flow factors 10%	CI	DCF
Year 0	1.000	1.000	1000	1000
Year 1	1.100	0.909	1100 (1000 x 1.1exp1)	909 (1000 x 1.10 exp-1)
Year 2	1.210	0.826	1210 (1000 x 1.1exp2)	826 (1000 x 1.10 exp-2)
Year 3	1.331	0.751	1331 (1000 x 1.1exp3)	751 (1000 x 1.10 exp-3)
Year 4	1.464	0.683	1464 (1000 x 1.1exp4)	683 (1000 x 1.10 exp-4)
Year 5	1.611	0.621	1611 (1000 x 1.1exp5)	621 (1000 x 1.10 exp-5)

Cost of capital = Cost of equity & cost of debt

WACC = Weighted average cost of capital

the relevant discount factor should be companies cost of capital or required rate of return

$$\left(\text{cost_of_equity} \times \frac{\text{value_of_equity}}{\text{value_of_equity} + \text{debt}} \right) + \left(\text{cost_of_debt} \times \frac{\text{value_of_debt}}{\text{value_of_equity} + \text{debt}} \right)$$

given rate of interest future cash flows are discounted and compared with capital outlay

Net present value (NPV) profitability index

Net present value			
	Discount factor	Cash flows	Present value
Year 1	0.909	6000	5454
Year 2	0.826	6000	4956
Year 3	0.751	6000	4506
Year 4	0.683	6000	4098
Year 5	0.621	6000	3726
Present value of cash inflows			22740
less capital outlay			18000
Net present value			4740

Profitability index

Profitability index		
		Project A
Present value of cash	A	13907
Capital outlay	B	15000
Profitability index	A / B	0.93

Discounted Payback

discounted cashflows used, otherwise exactly the same as payback period

Discounted Payback period			
Capital outlay - discounted cash flows = number of years			
Capital outlay	18000		3.75 years (12/4098 * 3098 = 9 / 12 = 0.75)
CF year 1	5454	12546	
CF year 2	4956	7590	
CF year 3	4506	3084	
CF year 4	4098	-1014	

Project appraisal techniques

Long term decision making

Internal rate of return (IRR)

requires no knowledge about companies cost in contrast to NPV, PI, DCPB

DCF method to find the discount rate where present value of inflows equal the capital outlay = IRR = 0 --> Break even point

Use only where difference between DCF's not > 5%

Internal Rate of return					
	Cash inflows	DCF 18%	PV	DCF 21%	PV
Year 1	6000	0.847	5082	0.826	4956
Year 2	6000	0.718	4308	0.683	4098
Year 3	6000	0.609	3654	0.564	3384
Year 4	6000	0.516	3096	0.467	2802
Year 5	6000	0.437	2622	0.386	2316
Present value			18762		17556
less capital outlay			18000		18000
Net present value			762		-444
IRR = d1 + [n1 / (n1+n2) x s] where d1 = lower DCF (18) d2 = higher DCV (21) n1= lower NPV (762) n2= higher NPV (-444) s= d2-d1					
18 + (762 / 1206 x 3) = 19.9%					

Financial variables

Initial capital outlay, Useful economic life, Residual value after life, amount & timing of cost and revenue, changes in level of cost & revenue, taxation assumptions, cost of capital, variation of financial variables

Investment decisions

- Asset replacement
 - replace assets which generate cash flow & profit
- Cost saving
 - important when sales are at maximum level, improve efficiency of existing assets, automation
- Expansion
 - internal or organic expansion
 - External acquisitions
- Reactive
 - Defensive response to market change
 - Legislative requirements

Input data is important

Future orientation, Attributable costs & revenues, Differential costs & revenues, Opportunity costs and benefits, Financing costs, Uncertainty & Inflation, Qualitative issues

Determining cash flows

Depreciation has to be added back to profit margin !!

Add up all cash-flows