

# Investment appraisal

2017-18

# OBJECTIVE

- ▶ criteria to choose among projects

# INVESTMENT APPRAISAL

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    - ▶ *capital cost*: money spent when setting up new venture
    - ▶ *net cash flow*: *cash inflows* minus *cash outflows*



# SIMPLE PAYBACK

- ▶ *Payback period*: amount of time it takes for a project to recover or pay back the initial outlay

**Table 2 Expected net cash flow from some new cutting machinery**

	<b>£000</b>					
	<b>Yr 0</b>	<b>Yr 1</b>	<b>Yr 2</b>	<b>Yr 3</b>	<b>Yr 4</b>	<b>Yr 5</b>
Net cash flow	(500)	100	125	125	150	150
Cumulative net cash flow	(500)	(400)	(275)	(150)	0	150

# SIMPLE PAYBACK

- ▶ *Payback period*: amount of time it takes for a project to recover or pay back the initial outlay
- ▶ Payback period can also be found by calculating the *cumulative net cash flow*

year 0 :	-	500 000	initial investment
year 1 :	+	100 000	cash flow
year 2 :	+	125 000	cash flow
year 3 :	+	125 000	cash flow
year 4 :	+	150 000	cash flow

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# WORKED EXAMPLE

**Table 3 Expected net cash flow from three projects**

	£000								
	Yr 0	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Total net cash flow	Payback period
A Net cash flow	(70)	10	10	20	20	30	40	60	4 yrs 4 mths
A Cumulative cash flow	(70)	(60)	(50)	(30)	(10)	20	60		
B Net cash flow	(70)	20	20	20	20	20	20	50	3 yrs 6 mths
B Cumulative cash flow	(70)	(50)	(30)	(10)	10	30	50		
C Net cash flow	(70)	30	30	20	10	10	10	40	2 yrs 6 mths
C Cumulative cash flow	(70)	(40)	(10)	10	20	30	40		

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- ▶ *simple* to use
- ▶ *cash-flow problems*: chosen project will *payback* investment faster

## AVERAGE (ACCOUNTING) RATE OF RETURN (ARR)

$$\text{ARR (\%)} = \frac{\text{net return (profit) per annum}}{\text{capital outlay (cost)}} \times 100$$

# WORKED EXAMPLE

**Table 5 The capital cost and net cash flow from three investment projects**

	Project X	Project Y	Project Z
Capital cost	£50,000	£40,000	£90,000
Return Yr 1	£10,000	£10,000	£20,000
Yr 2	£10,000	£10,000	£20,000
Yr 3	£15,000	£10,000	£30,000
Yr 4	£15,000	£15,000	£30,000
Yr 5	£20,000	£15,000	£30,000
Total net cash flows	£70,000	£60,000	£130,000



# WORKED EXAMPLE

**Table 6 The ARR calculated for three investment projects**

	Project X	Project Y	Project Z
Capital cost	£50,000	£40,000	£90,000
Total net profit (net cash flow – capital cost)	£20,000	£20,000	£40,000
Net profit p.a. (profit ÷ 5)	£4,000	£4,000	£8,000
ARR	8%	10%	8.9%

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- ▶ shows the *profitability* of an investment project
- ▶ *comparability*

# DISCOUNTED CASH FLOW (NET PRESENT VALUE OR NPV)

- ▶ *present value* of future cash flow or future profit earned

**Table 8 Value of £100 invested over five years at 10 per cent per annum compound interest**

Year	1	2	3	4	5
Value of £100	£110	£121	£133	£146	£161

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  - ▶ in *one* year:  $100 \times (1 + 0.1) = 110$

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  - ▶ in *two* years:  $110 \times (1 + 0.1) = 121$

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Year	1	2	3	4	5
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# DISCOUNTED CASH FLOW

## DISCOUNT TABLES

*discount tables*: shows by how much a *future value* must be multiplied to calculate its *present value*

Table 9 Discount table

Year	Rate of discount				
	5%	10%	15%	20%	25%
0	1.00	1.00	1.00	1.00	1.00
1	0.95	0.91	0.87	0.83	0.80
2	0.91	0.83	0.76	0.69	0.64
3	0.86	0.75	0.66	0.58	0.51
4	0.82	0.68	0.57	0.48	0.41
5	0.78	0.62	0.50	0.40	0.33
6	0.75	0.56	0.43	0.33	0.26
7	0.71	0.51	0.38	0.28	0.21
8	0.68	0.47	0.33	0.23	0.17
9	0.64	0.42	0.28	0.19	0.13
10	0.61	0.39	0.25	0.16	0.11



**Table 10 Net present value of three investment projects discounted at 20 per cent**

Year	Project A		Project B		Project C		Discount table Rate of discount at 20%
	Net cash flow £	Present value £	Net cash flow £	Present value £	Net cash flow £	Present value £	
0	(50,000)	(50,000)	(50,000)	(50,000)	(50,000)	(50,000)	1.00
1	10,000	8,300	5,000	4,150	20,000	16,600	0.83
2	10,000	6,900	8,000	5,520	16,000	11,040	0.69
3	10,000	5,800	10,000	5,800	14,000	8,120	0.58
4	10,000	4,800	12,000	5,760	12,000	5,760	0.48
5	10,000	4,000	12,000	4,800	12,000	4,800	0.40
6	10,000	3,300	12,000	3,960	12,000	3,960	0.33
7	10,000	2,800	12,000	3,360	12,000	3,360	0.28
8	10,000	2,300	14,000	3,220	10,000	2,300	0.23
9	10,000	1,900	16,000	3,040	8,000	1,520	0.19
10	10,000	1,600	20,000	3,200	5,000	800	0.16
Total net cash flow before discounting	50,000		71,000		71,000		
Present values years 1–10		41,700		42,810		£58,260	
Net present value (NPV)		(8,300)		(7,190)		+8,260	

# ADVANTAGES OF THE DISCOUNTED CASH-FLOW METHOD

# LIMITATIONS OF THESE TECHNIQUES

**Table 11 Limitations of the methods of investment**

Appraisal method	Limitations
Simple payback	Cash earned after the payback period is ignored The profitability of the method is overlooked
Average rate of return	The effects of time on the value of money are ignored
Discounted cash flow	The calculation is more complex than the other methods The rate of discount is critical – if it is high, fewer projects will be profitable

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- ▶ **Present value:** the value today of a sum of money available in the future

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- ▶ **Hawthorne effect:** The idea that workers are motivated by recognition given to them as a group

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- ▶ **Piece rates:** A payment system where employees are paid an agreed rate for every item produced

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- ▶ **Teamworking:** Organising people into working groups that have a common aim

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- ▶ **Paternalistic leadership:** A leadership style where the leader makes decisions but takes into account the welfare of employees