

INVESTMENT APPRAISAL

This topic is concerned with the evaluation of longer term projects that involve significant capital investment

What is a capital investment project ?

The key characteristic of such projects is the tying up of capital for a number of years , in order to earn profits or returns over the period

What will the capital be invested in ?

The most common investment you will encounter will be in tangible fixed assets , such as the purchase of a new machine , factory or premises from which to operate a new service business .

Estimation of Monetary Costs and Benefits

Costs of the initial investment and the ongoing , year by year operating costs and income relevant to the project will need to be estimated .

This is not only for the initial appraisal decision , but also for budgeting , resource allocation and cost control purposes

Problems in Estimating Income and Costs for Capital Projects

- Timescale

Such projects may extend over tens of years during which markets , availability of resources and inflation rates can vary considerably

- Unknown Territory

If the project involves a new line of business , the management may have little knowledge of the relevant factors involved

Specialists may need to be consulted

- Identification of the Relevant Costs / Income

For appraisal purposes only the relevant costs and income of the project should be considered

i.e. costs and income that would not arise if the project were rejected

RETURN ON CAPITAL EMPLOYED

- The ROCE approach makes the assumption that the main factor in determining the worth of an investment is the level of profitability that is expected to be achieved .

$$\text{ROCE} = \frac{\text{Average annual profit after depreciation}}{\text{Original capital invested}} \times 100\%$$

- Once the ROCE has been calculated , we need a required rate of return for the business for comparison purposes in order to make our decision

ADVANTAGES AND DISADVANTAGES OF ROCE

ADVANTAGES

- It is simple to calculate
- It is easy to understand
- If high profits are required , this is certainly a way of achieving them
- It is consistent with the return on investment measure used to compare divisional performance in many companies

DISADVANTAGES

- It is an average and hence takes no account of the timing of the profits
- It does not account for the differing lives of projects

e.g.

A 5 year project with a ROCE of 9% is not necessarily better than a 10 year project with a ROCE of 8%

- It takes no account of the size of the investment

e.g.

If project A required an investment of £80000 and yielded a ROCE of 10% , whereas project B required an investment of only £10000 but yielded 15% , it would not be possible to say in all circumstances that B was the better

We would need to know what return the £70000 not invested would be expected to yield

- It is a profit measure and as such is only a worthwhile measure if it is high profits that are the investor's main objective

However , it is in an investor's best interests to not look solely at profits but to pay more attention to the cashflows expected from an investment and to the timing of these cashflows

e.g.

Project A operates on a cash basis and £100000 p.a. is received for 3 years

Project B is a long term contract and £303000 is received at the end of the contract

Which is the more worthwhile investment ?

RETURN ON CAPITAL EMPLOYED — EXAMPLE

A machine is available for purchase at a cost of £80,000. We expect it to have a life of five years and to have a scrap value of £10,000 at the end of the five-year period. We have estimated that it will generate additional profits over its life as follows:

	£
1st year	20,000
2nd year	40,000
3rd year	30,000
4th year	15,000
5th year	5,000

These estimates are of profits before depreciation.

Required

Calculate the return on capital employed.

RETURN ON CAPITAL EMPLOYED — SOLUTION

Total profit before depreciation over the life of the machine = £110,000

Therefore average profit pa. (before depreciation) = $\frac{£110,000}{5} = £22,000$

Total depreciation over the life of the machine = 80,000 - 10,000 = £70,000

Therefore average depreciation p.a. = $\frac{£70,000}{5} = £14,000$

Therefore average annual profit after depreciation = 22,000 - 14,000

Original investment required = £80,000

Therefore ROCE = $\frac{8,000}{80,000} \times 100\% = 10\%$

PAYBACK PERIOD

The payback period is a very simple appraisal tool and is a purely cash measure . It represents the number of years it takes to recoup the original investment

ADVANTAGES AND DISADVANTAGES OF THE PAYBACK PERIOD

ADVANTAGES

- It is easy to calculate
- It is easy to understand
- It is less affected by uncertainty

The payback period is dependant only on the earlier cash forecasts which are likely to be more reliable than the more distant ones

- It can be very useful in specific circumstances such as when the company has liquidity problems

Clarke Ltd

Clarke Ltd is considering a project requiring an investment of £120,000 in assets having a life of five years and a final scrap value of £20,000. The project will generate the following net cash earnings before tax and depreciation. Also shown are estimates of the scrap value of the assets throughout the life of the project.

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
Net cash earnings	£30,000	£40,000	£30,000	£20,000	£10,000
Scrap values	£70,000	£50,000	£35,000	£25,000	£20,000

Required

Calculate:

- (a) return on capital employed;
- (b) payback period.

Clarke Ltd — SOLUTION

(a) $ROCE = \frac{E-D}{I} \times 100$

where: $E = \text{Earnings } 1/5 \times £130,000 = £26,000$
 $D = \text{Depreciation } 1/5 \times £100,000 = £20,000$
 $I = \text{Investment} = £120,000$

$$ROCE = \frac{26-20}{120} \times 100 = 5\%$$

(b) £120,000 recouped after 4 years

$$P = 4 \text{ years}$$

TIME

TOTAL CASHFLOW

~~0~~

~~00000~~

1

30000

2

70000

3

100000

4

120000

5

130000

DISCOUNTED CASH FLOW (DCF)

TERMINAL VALUES

We have already discussed the idea of , and the reasoning behind , basing decisions on the expected cashflows from an investment

However , we shall now explain that the timing of these cashflows is of primary importance

EXAMPLE

We have 2 possible projects for appraisal both of which require an immediate outlay of £220000 :

Project A : £100000 will be received at the beginning of each of the next 3 years

Project B : £300000 will be received in 3 years time

The annual interest rate is 10%

One method of dealing with this problem is by “compounding” the interest on each flow individually . We will take each cashflow individually and calculate the interest applicable .

e.g.

£100 received now will have grown in one year's time with interest at 10% to £100 + 0.1 of £100

$$\text{i.e. } £100 \times 1.1 = £110$$

and after a further year, the total will grow by another 10% of the total to £121

$$\text{i.e. } £100 \times (1.1)^2 \text{ and so on}$$

Applying this idea to projects A and B will give the following :

Project A :

TIME	CASHFLOW		TERMINAL VALUE
0	(220000)	$\times (1.1)^3$	(292820)
1	100000	$\times (1.1)^2$	121000
2	100000	$\times 1.1$	110000
3	100000		100000
			38180

Project B :

TIME	CASHFLOW	TERMINAL VALUE
0	$(220\,000) \times (1.1)^3$	$(292\,820)$
3	300 000	300 000
		7180

The net surplus is known as the net terminal value and the appraisal criterion is that an investment should be accepted if it produces a surplus in cash terms after accounting for interest

i.e. if it produces a positive net terminal value

PRESENT VALUES

One way of accounting for the interest on cashflows is to calculate the terminal values as we have just seen . However , this method can prove cumbersome and even misleading at times . For example , with project A , the surplus of £38180 will not arise in full until the expiry of 3 years .

How could we compare project A with say project C which had a net terminal value of only £35000 but this time at the expiry if only 2 years?

The easiest way of doing this is to use what are known as present values rather than terminal values . This means that instead of compounding cashflows forward to give terminal values , they are discounted back to time 0 to give present values .

To explain , consider the following example :

Suppose we were to receive £50000 in one year's time and the rate of interest was 20% per annum . The present value of the flow of £50000 is the equivalent amount received now i.e. how much received now would have grown to £50000 if invested at 20% pa? If the equivalent amount were Y , then in 1 year's time we would have £Y together with 20% interest or $Y \times 1.2$

To have grown to £50000 ,

$$Y \times 1.2 = 50000$$

$$Y = 50000 \times \frac{1}{1.2}$$

$$\text{So } Y = £41667$$

Hence the present value of £50000 in 1 year with interest at 20% is £41667 .

Now , calculate the present values of the following cashflows :

- (a) £100000 in 1 year with interest at 18%
- (b) £60000 in 2 years with interest at 5%
- (c) £200000 in 3 years with interest at 10%

Answers

$$(a) \quad Y \times (1.18) = 100,000$$

$$PV = Y = 100,000 \times \frac{1}{1.18}$$

$$= £84,746$$

$$(b) \quad Y \times (1.05)^2 = 60,000$$

$$PV = Y = 60,000 \times \frac{1}{(1.05)^2}$$

$$= £54,422$$

$$(c) \quad PV = 200,000 \times \frac{1}{(1.1)^3}$$

$$= £150,263$$

Let us apply this approach to the original example where the flows were:

<i>Year</i>	<i>Project A</i>
0	(220,000)
1	100,000
2	100,000
3	100,000

and the interest rate was 10% pa.

Calculate the present value of each flow individually and hence the net present value.

Solution

<i>Year</i>	<i>Cash flows</i>		<i>Present value</i> £
0	(220,000)		(220,000)
1	$100,000 \times 1/1.1$	=	90,909
2	$100,000 \times 1/(1.1)^2$	=	82,645
3	$100,000 \times 1/(1.1)^3$	=	<u>75,131</u>
Net present value			<u>28,685</u>