

ACCAspace

Provided by
ACCA Research Institute



ACCA F2

Management Accounting (MA)

管理会计

ACCA Lecturer: Belinda Qiu





Part C Flexible budgets and Capital budget

1. Flexible budget and fixed budget
2. Preparing a flexible budget
3. Responsibility center
4. Controllable and non-controllable cost
5. Capital expenditure and revenue expenditure



Part C Project appraisal

1. Relevant/irrelevant cost
2. Interest rate
3. Discount factor(cost of capital)
4. PV (annuity, perpetuity)
5. NPV (calculation, adv. & disadv.)
6. Payback period (calculation, adv. & disadv.)
7. Discounted Payback period (calculation, adv. & disadv.)
8. IRR (calculation, adv. & disadv.)



Part C Project appraisal

The key methods of project appraisal are:

- The payback period
- Net present value
- Discounted payback period
- Internal rate of return (IRR)



Part C Project appraisal

如何评估一个项目？

1. 为什么要做这个项目？

-corporate strategy

-benefit > cost, cost and benefit analysis

3. Benefit有哪些？

- 有形：future cash flow, reduce in operating cost

- 无形：business image, advertisement

3. Cost有哪些？

-input (期初,每期 , 期末)

-分清哪些是cost , 与本项目有关的才是cost



Part C Project appraisal

1. Relevant cost

Future cash flows arising as a direct consequence of the decision under consideration.

Three elements:

-cash flow : actual cash flow should be considered and non-cash item should be ignored.(depreciation)

-future cost : sunk cost

-differential costs and revenue : only those cost and revenue that alter as a result of a decision are relevant . Where factors are common to all the alternative being considered they can be ignored. Only differences are relevant.



Part C Project appraisal

Some relevant and irrelevant cost terms :

Cost	Relevant /irrelevant
Sunk cost	The cost has been incurred as a result of a decision, irrelevant
Fixed cost	Generally irrelevant. If the decision result in a step change, they are relevant.
Opportunity cost	The foregone from giving up the alternative use of a scare resource when a decision arise. Relevant
Avoidable and unavoidable cost	Avoidable –relevant Unavoidable –irrelevant
Depreciation	Irrelevant because it is not cash flow.
Committed cost	Future cost than cannot be avoided whatever the decision is taken. Irrelevant



Part C Project appraisal

2. Net present value

2.1 simple and compound interest

2.1.1 simple interest

-Simple interest is calculated based on the original sum invested.

$$-S = P + (P * r * n)$$

S: future value of the investment

P: initial investment

r: interest rate

n: number of time periods



Part C Project appraisal

2.1.2 compound interest

-The figure of compounding a sum is increased by the amount of interest it would earn over the period. Interest is earned on interest gained in earlier periods.

$$-S = P * (1 + r)^n$$



Part C Project appraisal

2.1.3 Nominal and effective interest rate

Effective annual rate of interest: $(1 + R) = (1 + r)^n$

Where

R is the effective annual rate

r is the period rate

n is the number of periods in a year

$$r = \left(1 + \frac{i}{n}\right)^n - 1$$

r: effective interest rate

i: nominal interest rate

n: number of time period

10% per year, with interest calculated quarterly

10.25% per year, with interest calculated annually.

$$\left(1 + \frac{10\%}{4}\right)^4 - 1 = 10.38\% > 10.25\%$$



Part C Project appraisal

2.2 discounting cash flow

2.2.1 discounting

-Opposite function to compounding

-discounting : present value

compounding : future value

Discounted cash flow techniques take account of the time value of money – the fact that \$1 received now is worth more because it could be invested to become a greater sum at the end of a year, and even more after the end of two years, and so on. As with payback, DCF techniques use cash figures before depreciation in the calculations.



Part C Project appraisal

PV = future value * discount factor

$$\text{Discount factor} = \frac{1}{(1+r)^n}$$

Example: \$25,000 receivable in six years' time and interest rate is 10% p.a.

$$\text{PV} = 25000 * \frac{1}{(1+10\%)^6} = 25000 * 0.564 = 14100$$



Part C Project appraisal

2.2.2 annuity

Annuities are an annual cash payment or receipt which is the same amount every year for a number of years.

PV = annual cash flow * annuity factor

$$\text{Annuity factor} = \frac{1 - (1+r)^{-n}}{r}$$



Part C Project appraisal

2.2.3 perpetuity

A perpetuity is an annuity that lasts forever. The present value of a perpetuity of 'a' per annum, commencing in one year, is $PV = a/r$ where r is the cost of capital as a proportion.

$$PV = \text{annual cash flow} * \frac{1}{r}$$



Part C Project appraisal

Example:

- a) A 5-year \$600annuity is starting today. R=10%
- b) A perpetuity of \$2000 is due to commerce immediately. R=9%
- c) A 4-year \$200annuity is starting in 3 years. R=5%

a) $600+600*3.170=2502$

b) $2000+2000*\frac{1}{9\%}=24222$

c) $\frac{200*3.546}{(1+5\%)^2}=643$



Part C Project appraisal

A 4-year \$200 annuity is starting in 3 years. $R=5\%$





Part C Project appraisal

2.2.4 cost of capital

在计算NPV时，把cost of capital当做discount factor使用，进行折现
或者是在进行project appraisal时，与IRR进行比较（IRR部分设计）



Part C Project appraisal

2.3 NPV : the surplus funds (after funding the investment) earned on the project.

The **net present value (NPV) method** of evaluation is as follows.

- (a) **Determine the present value of costs**
In other words, decide how much capital must be set aside to pay for the project. Let this be \$C.
- (b) **Calculate the present value of future cash benefits from the project**
To do this we take the cash benefit in each year and discount it to a present value. This shows how much we would have to invest now to earn the future benefits, if our rate of return were equal to the cost of capital. ('Cost of capital' is explained below.) By adding up the present value of benefits for each future year, we obtain the total present value of benefits from the project. Let this be \$B.
- (c) **Compare the present value of costs \$C with the present value of benefits \$B**
The NPV is the difference between them: $\$(B - C)$.
- (d) **NPV is positive**
The present value of benefits exceeds the present value of costs. This in turn means that the project will earn a return in excess of the cost of capital. Therefore, the project should be accepted.
- (e) **NPV is negative**
This means that it would cost us more to invest in the project to obtain the future cash receipts than it would cost us to invest somewhere else, at a rate of interest equal to the cost of capital, to



Part C Project appraisal

Advantages of NPV	Disadvantages of NPV
Shareholder wealth is maximised .	It can be difficult to identify an appropriate discount rate .
It takes into account the time value of money .	For simplicity, cash flows are sometimes all assumed to occur at year ends : this assumption may be unrealistic.
It is based on cash flows which are less subjective than profit.	Some managers are unfamiliar with the concept of NPV.
Shareholders will benefit if a project with a positive NPV is accepted.	



Part C Project appraisal

3. Payback period

3.1

The **payback period** is the time taken for the initial investment to be recovered in the cash inflows from the project. The payback method is particularly relevant if there are liquidity problems, or if distant forecasts are very uncertain.

The **payback period** method is one which gives greater weight to cash flows generated in earlier years. The payback period is the length of time required before the total cash inflows received from the project is equal to the original cash outlay. In other words, it is the length of time the investment takes to pay itself back.



Part C Project appraisal

Project X has the following cash flows.

Year	Cash flow \$
0	(105,000)
1	25,000
2	35,000
3	35,000
4	40,000
5	50,000

What is project X's payback period?

- A 3 years
B 3.25 years
C 3.75 years
D 4 years

ANSWER

B $(25,000 + 35,000 + 35,000) = 95,000$ will be paid back at the end of year 3 leaving 10,000 to be repaid in year 4.

$$\frac{10,000}{40,000} = 0.25 \text{ therefore payback occurs after 3.25 years.}$$



Part C Project appraisal

3.3 advantage and disadvantage

Advantages of payback method	Disadvantages of payback method
It is easy to calculate and understand.	Total profitability is ignored.
It is widely used in practice as a first screening method.	The time value of money is ignored.
Its use will tend to minimise the effects of risk and help liquidity , because greater weight is given to earlier cash flows which can probably be predicted more accurately than distant cash flows.	It ignores any cash flows that occur after the project has paid for itself . A project that takes time to get off the ground but earns substantial profits once established might be rejected if the payback method is used, whereas a smaller project, paying back more quickly, may be accepted.
It identifies quick cash generators .	The cut-off period for deciding what is acceptable is arbitrary .



Part C Project appraisal

4. Discounted payback period

The **discounted payback method** applies discounting to arrive at a payback period after which the NPV becomes positive.

Example: assume cost of capital = 10%

Project X has the following cash flows.

Year	Cash flow \$
0	(105,000)
1	25,000
2	35,000
3	35,000
4	40,000
5	50,000

Year	CF	Discounted factor	PV	Cumulative PV
0	(105,000)	1	(105,000)	(105,000)
1	25,000	0.909	22,725	(82,275)
2	35,000	0.826	28,910	(53,365)
3	35,000	0.751	26,285	(27,080)
4	40,000	0.683	27,320	240
5	50,000	0.621	31,050	



Part C Project appraisal

5. Internal rate of return (IRR)

The **internal rate of return technique** uses a trial and error method to discover the discount rate which produces the NPV of zero. This discount rate will be the return forecast for the project.

The **internal rate of return (IRR) method** of DCF involves two steps.

- Calculating the rate of return which is expected from a **project**
- Comparing the rate of return with the **cost of capital**

If a project earns a **higher rate of return** than the cost of capital, it will be worth undertaking (and its NPV would be **positive**). If it earns a **lower rate of return**, it is not worthwhile (and its NPV would be **negative**). If a project earns a return which is exactly equal to the cost of capital, its NPV will be 0 and it will only just be worthwhile.



Part C Project appraisal

A formula for making this calculation (which is known as **interpolation**) is as follows.

$$\text{IRR} = A + \left[\frac{a}{a - b} \times (B - A) \right] \text{ss}$$

where A is the discount rate

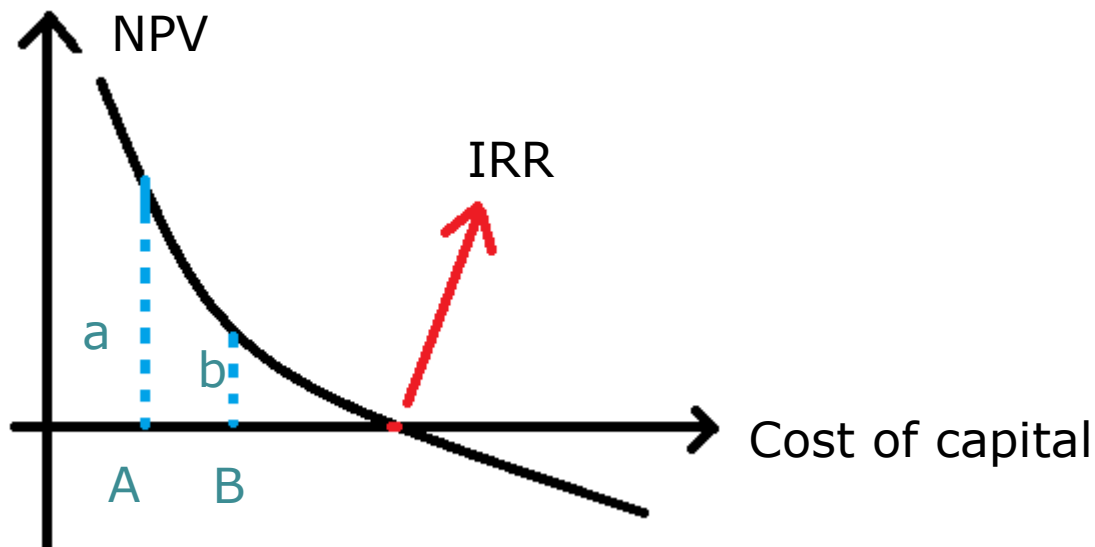
a is the amount of the

B is the discount rate

b is the amount of the

NPV

NPV





Part C Project appraisal

The following are advantages of using IRR.

- (a) It takes into account the **time value of money**, unlike other approaches such as payback.
- (b) Results are expressed as a **simple percentage**, and are more easily understood than some other methods.
- (c) It indicates how **sensitive** calculations are to changes in interest rates.

5.8.4 Problems with the IRR method

The following are problems of using IRR.

- (a) Projects with unconventional cash flows can produce **negative** or **multiple IRRs**.
- (b) IRR may be **confused** with return on capital employed (ROCE), since both give answers in percentage terms.
- (c) It may give **conflicting recommendations** with mutually exclusive projects, because the result is given in relative terms (percentages), and not in absolute terms (\$s) as with NPV.
- (d) Some **managers** are **unfamiliar** with the IRR method.
- (e) It cannot accommodate **changing interest rates**.
- (f) It assumes that funds can be **reinvested** at a rate equivalent to the IRR, which may be too high.



Part C Flexible budgets and budgetary control

Exercise



Part C Project appraisal

Q1. The following measures have been calculated to appraise a project
IRR=12%, return on capital employed=16%, payback period is 4 years.

Which of the following is correct?

- A. The payback is less than 5 years so the project should go ahead.
- B. The IRR is lower than the return on capital employed so the project should not go ahead .
- C. The IRR is greater than the return on capital employed so the project should go ahead .
- D. The IRR is positive so the project should go ahead .

B



Part C Project appraisal

The following question is taken from the June 2013 exam paper.

A project has an initial outflow of \$12,000 followed by six equal annual cash inflows, commencing in one year's time. The payback period is exactly four years. The cost of capital is 12% per year.

What is the project's net present value (to the nearest \$)?

- A \$333
- B -\$2,899
- C -\$3,778
- D -\$5,926

ACCA examining team comments

The question relates to study guide reference C5j.

The correct answer is A.

A four year payback period implies an (equal) annual cash flow of $\$12,000 \div 4 \text{ years} = \$3,000$ per year. As these cash flows run for 6 years the NPV is equal to $\$333$ ($-\$12,000 + \text{annuity factor for 6 years @ } 12\% \times \$3,000 = -\$12,000 + 4.111 \times \$3,000 = \$333$). Alternative C is based upon an incorrect calculation of annual cash flow ($\$12,000 \div 6 \text{ years} = \$2,000$ per year), suggesting a misunderstanding of the payback method.

In alternative B the NPV was based on a project life of 4 years rather than 6 suggesting a failure to read the question carefully.

Finally alternative D's NPV was based upon a combination of the other two distracters, that is, an annual cash flow of \$2,000 for 4 years.



Part C Project appraisal

Q3. The details of an investment project are as follows:

Cost of assets bought at the beginning of the project: \$80,000;

annual cash flow: \$25,000; cost of capital: 5% per year;

life of the project: 8 years

PV of the project ?



Part C Project appraisal

Q4. A company is planning to open a new store in a new geographic location. An initial site evaluation has taken place at a cost of \$5,000 and a store location has been found. The new store has been rented for \$9,500 per annum. It will require refurbishment at a cost of \$320,000. which of the following costs are relevant for an NPV Calculation?

- (1) \$5,000 (2) \$9,500 (3) \$320,000
- A. 1
B. 12
C. 23
D. 3



Part C Project appraisal

Q5. If a single sum of \$12,000 is invested at 8% per annum with interest compounded quarterly, the amount to which the principal will have grown by the end of year three is approximately?



Part C Project appraisal

Q6. find the PV of ten annual payment of \$700, the first paid immediately and discounted at 8%, giving your answer to the nearest \$.

ACCAspace

Provided by
ACCA Research Institute



Thank You!

