C9: Accounting and Finance Course

Module 7

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Acknowledgements

Contents

Module overview

Welcome to Module 7

This module contains three main topics. First, the concept of cost of capital, and, in particular, how to calculate the component elements of a firm's cost of capital given their capital structure.

Secondly, using the cost of capital concept, how do firms assess capital investment opportunities? Various techniques are introduced to assist managers to assess whether projects will enhance shareholder wealth.

Finally the management of short-term and long-term funds are discussed with reference to the efficient management of both sources.

Upon completion of this module you will be able to:

Outcomes

- *Demonstrate* knowledge and understanding of the cost of capital and how it is calculated.

- *Demonstrate* knowledge and understanding of capital investment procedures and the various evaluation techniques that can be used to assess whether or not a capital project should be undertaken.

- *Demonstrate* knowledge and understanding of the source and cost of short-term funding together with an appreciation of the issues relating to raising equity.

- *Demonstrate* knowledge and understanding of the role of intermediate financial institutions.

Unit 16

Cost of capital

Introduction

This unit introduces you to an important financial concept, the cost of capital. The mechanics of computing the sources of capital-debt, preferred stock, common stock, and retained earnings are reviewed. The relationship between the cost of capital and both the firm's financing activities and capital investment decisions is explored. In the framework of a target capital structure, the weighted average cost of capital is then applied to capital investment decisions.

The unit comprises:

- The cost of capital
- The cost of debt
- Preferred shares
- Ordinary shares
- The weighted average cost of capital

Upon completion of this unit you will be able to:

Outcomes

- *Understand* the key assumptions, the basic concept, and the specific sources of capital associated with the cost of capital.
- *Determine* the cost of long-term debt and the cost of preferred shares.
- *Calculate* the cost of common share equity and convert it into the cost of retained earnings and the cost of new issues of common shares.
- *Calculate* the weighted average cost of capital (WACC).

Terminology

Terminology

Constant growth (Gordon) model:	Assumes that the value of a share equals the present value of all future dividends (assumed to grow at a constant rate) over an infinite time horizon.
Cost of capital:	The rate of return that a firm must earn on its project investments to maintain its market value

and attract funds.

Cost of debt:	The after-tax cost today of raising funds through borrowing.
Cost of ordinary equity:	The rate at which investors discount the expected dividends of the firm in order to determine its share value.
Cost of preference shares:	The ratio of the preference share dividend to the firm's net proceeds from the sale of preference shares; calculated by dividing the annual dividend by the net proceeds from sale of the preference shares.
Weighted average cost of capital:	Determined by weighting the cost of each specific type of capital by its proportion in the firm's capital structure.

Capital cost concept

The cost of capital is a term used to refer to the cost of a company's funds (both debt and equity), or, from an investor's point of view: the shareholder's required return on a portfolio of all the company's existing securities. It is used to evaluate new projects of a company as it is the minimum return that investors expect for providing capital to the company, thus setting a benchmark that a new project has to meet.

For an investment to be worthwhile, the expected return on capital must be greater than the cost of capital. The cost of capital is the rate of return that capital could be expected to earn in an alternative investment of equivalent risk. If a project is of similar risk to a company's average business activities it is reasonable to use the company's average cost of capital as a basis for the evaluation. A company's securities typically include both debt and equity, and so we must therefore calculate both the cost of debt and the cost of equity to determine a company's cost of capital.

The cost of debt is relatively simple to calculate, as it is composed of the current market rate of interest that would be required to be paid by the organisation. In practice, the interest rate paid by the company can be modelled as the risk-free rate plus a risk component (risk premium), which itself incorporates a probable rate of default (and amount of recovery given default). For companies with similar risk or credit ratings, the interest rate is largely exogenous (not linked to the company's activities).

The cost of equity is more challenging to calculate as equity does not pay a set return to its investors. Similar to the cost of debt, the cost of equity is broadly defined as the risk-weighted projected return required by investors, where the return is largely unknown. The cost of equity is therefore inferred by comparing the investment to other investments

(comparable) with similar risk profiles to determine the "market" cost of equity. It is commonly equated using the CAPM which was discussed in Unit 14.

Once cost of debt and cost of equity have been determined, their blend, the weighted-average cost of capital (WACC), can be calculated. This WACC can then be used as a discount rate for a project's projected cash flows.

In the following sections of this unit we will discuss the cost of debt, preference shares and ordinary shares in detail before concluding with a discussion on the weighted average cost of capital.

Cost of debt

The cost of debt is calculated by taking the rate on a risk-free bond whose duration matches the term structure of the corporate debt, then adding a default premium.

The default premium will rise as the amount of debt increases because risk increases as the amount of debt increases. Since in most cases debt expense is a deductible expense for taxation purposes, the cost of debt is calculated as an after-tax cost to make it comparable with the cost of equity, as earnings that are available to shareholders are also after-tax.

Therefore the cost of debt is discounted by the tax rate. The formula can be written as (Rf + credit risk rate)(1-t), where t is the corporate tax rate and Rf is the risk free rate.

The yield to maturity, which was discussed in Unit 14, can also be used as the cost of debt.

Case study/example

If the cost of debt for Energy Limited is 12 per cent (effective rate) and its tax rate is 40 per cent then:

Kd after taxes $\quad$ = Kd (1 – tax rate)

$\qquad$ = 12 (1 – 0.4) = 7.2 %

Note: we use the effective annual rate of debt based on current market conditions (that is, yield to maturity on debt). We do not use historical rates (interest rate when issued; the stated rate).

Preferred shares

Preferred shares have a higher return than bonds, but are less costly than ordinary shares. This is because in the case of default, preferred shareholders get paid before ordinary shareholders. However, in the case of bankruptcy, the holders of preferred shares get paid only after short and long-term debt holder claims are satisfied.

Preferred shareholders receive a fixed dividend and usually cannot vote on the firm's affairs.

The cost of preferred shares (Kp) can be expressed as:

preferred share dividend
market price of preferred stock

Or if issuing new preferred shares:

preferred share dividend
market price of preferred stock (1 – flotation cost)

Unlike bonds, no adjustment is made for taxes, because preferred share dividends are paid after a company pays income taxes. Consequently, a firm assumes the full market cost of financing by issuing preferred shares In other words, the firm cannot deduct dividends paid as an expense, as they can for interest expenses.

If Energy Limited is issuing preferred stock at $130 per share, with a stated dividend of $16.75, and a flotation cost of 5 per cent, then:

= $16.75 / $130 (1-0.05)   = 13.56 %

Case study/example

Ordinary shares

The cost of equity can comprise two components:

- cost of retained earnings, and

- cost of new issue common shares.

The cost of retained earnings refers to the return that common shareholders require the firm to earn on the funds that have been retained, thus reinvested in the firm, rather than paid out as dividends.

In this case, the firm must earn a return on reinvested earnings that is sufficient to satisfy existing common shareholders' investment demands. If this required return is not earned, then the shareholders will demand that the firm pays them the earnings in the form of dividends so that they can invest the funds outside the firm at a better rate.

In essence, then, the common shareholders are telling the firm that if it cannot invest at some minimum rate of return, then the earnings should be paid out as dividends so that the investors can invest in alternatives of their choice.

The cost of new issue common shares refers to the rate of return required by common shareholders after considering the cost associated with issuing new shares.

The cost of external equity is determined in exactly the same manner as the cost of retained earnings, except we recognise the fact that there are costs involved with issuing new shares and these costs reduce the total amount of funds that can be used by the firm for financing new assets.

Because the firm has to provide the same gross return to new shareholders as existing shareholders, when the flotation costs associated with a common share issue are considered, the cost of new common shares always must be greater than the cost of existing shares (that is, the cost of retained earnings).

Generally there are three ways in which the cost of ordinary equity can be calculated:

1. Capital asset pricing model (CAPM)

2. Constant dividend growth model (sometimes referred to as the Gordon growth model)

3. Bond yield plus risk premium

Methods 1 and 2 were introduced to you in Unit 14.

Cost of equity using CAPM

The CAPM is one of the most commonly used ways to determine the cost of common stock. This "cost" is the discount rate for valuing common stocks, and provides an estimate of the cost of issuing common stocks.

$$K_s = K_{rf} + \beta (K_m - K_{rf})$$

Where:

- K_{rf} is the risk free rate

- β is the firm's beta

- K_m is the return on the market

Energy Limited has a $\beta = 1.6$. The risk free rate on treasury-bills is currently 4 per cent and the market return has averaged 15 per cent.

$$
\begin{aligned}
K_s &= K_{rf} + \beta (K_m - K_{rf}) \\
&= 4 + 1.6\,(15 - 4) = 21.6\ \%
\end{aligned}
$$

Case study/example

Cost of equity using the constant growth model

You will recall that in Unit 14 we defined the value of an ordinary share to be equal to the present value of all future dividends receivable. In one model we assumed that dividends would grow at a constant annual rate over an infinite time horizon. This is the constant growth valuation model, also known as the Gordon model.

The value of a constant growth stock can be determined using the following equation:

$$P_0 = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g}$$

Where:

- P_0 = the stock price at time 0,
- D_0 = the current dividend,
- D_1 = the next dividend (i.e., at time 1),
- g = the growth rate in dividends,
- r = the required return on the stock, and
- g < r.

The constant growth share equation can be rearranged to obtain an expression for the expected return on the share as follows:

$$r = \frac{D_1}{P_0} + g$$

Case study/example

Energy Limited expects the next dividend payment to be $3.30 per share, the price of its stock currently is $22, and it is estimated that the firm will grow at a constant rate of 5 per cent, then this information suggests that the cost of retained earnings should be:

(3.30 / 22) + 5% = 20%

Bond yield plus risk premium

Research has shown that the return on equity for a particular firm is approximately 3 to 5 percentage points higher than the return on its debt. Thus, as a general rule of thumb, firms often compute the YTM for their bonds and then add 3 to 5 per cent to the result.

Case study/example

Earlier we found that the before-tax return (YTM) on Energy Limited's debt was 12 per cent. Thus, as a rough estimate, we might say the cost of retained earnings is 16% = 12% + 4%.

For our illustrative firm, Energy Limited, the three approaches we used to determine the cost of retained earnings give three different results. This is not unexpected, because the three approaches are based on different assumptions.

As mentioned, the CAPM approach assumes investors are extremely well diversified, the dividend growth approach assumes the firm grows at a constant rate, and the bond-yield-plus-risk-premium approach assumes that the return on equity is related to the return on the firm's debt.

In an ideal situation (the perfect world), all three approaches should give the same result. But, when we find different values and we don't have any reason to discard any of them, generally we simply average the results.

In the case of Energy Limited, the average is 18% = (18% + 16% + 20%)/3. Similar to preferred shares, this figure is not adjusted for taxes because dividends, regardless of the type, are not tax deductible expenses for the firm.

So, determining the cost of equity requires some judgment – there is no one simple rule that can be used when computing the cost of retained earnings.

Weighted average cost of capital (WACC)

In the previous section, we showed that our illustrative firm, Energy Limited has an after-tax cost of debt equal to 7.2 per cent, a cost of preferred stock equal to 13.56 per cent, a cost of equity equal to 18 per cent.

To make decisions about capital budgeting projects, we need to combine these costs into a single required rate of return. The concept for combining these values to provide a single value, which is called the weighted average cost of capital, or WACC, is very simple – calculate the weighted average of these costs using as the weights the proportion each type of financing makes up of the total financing of the firm. For example, suppose Energy Limited has the following capital structure:

- 40 per cent debt
- 10 per cent preferred shares
- 50 per cent common shares

$$WACC = 0.4(7.2\%) + 0.1(13.56\%) + 0.5(18\%)$$
$$= 2.88 + 1.36 + 9$$
$$= 13.24\ \%$$

Therefore, the average cost of the firm's financing, its WACC, is 13.24 per cent, which represents the average rate of return the firm must earn on its existing investments to ensure the value of the firm does not decrease – that is, WACC = r = required rate of return.

Activity 7.1

Activity

1. What is the cost of capital? What role does it play in making long-term investment decisions?

2. Why is the cost of capital measured on an after-tax basis? Why is the use of a weighted average cost rather than the cost of specific funds recommended?

3. How is the before-tax cost of debt converted into the after-tax cost?

4. Calculate the after-tax cost of debt if the before-tax cost of debt for a firm is 11 per cent and it has a 35 per cent marginal tax rate.

5. A firm has issued 10 per cent preferred share, which sold for $100 per share par value. The cost of issuing and selling the stock was $2 per share. The firm's marginal tax rate is 40 per cent. Calculate the cost of the preferred share.

6. A firm has a beta of 1.2. The market return equals 14 per cent and the risk-free rate of return equals 6 per cent. Calculate the cost of common equity.

7. A firm has common share with a market price of $25 per share and an expected dividend of $2 per share at the end of the coming year. The growth rate in dividends has been 5 per cent. Calculate the cost of the firm's common equity.

8. A firm has common shares with a market price of $55 per share and an expected dividend of $2.81 per share at the end of the coming year. The dividends paid on the shares over the past five years are as follows:

Year	Dividend
1	$2.00
2	2.14
3	2.29
4	2.45
5	2.62

   a. Calculate the cost of the firm's common equity.

9. A firm has determined its cost of each source of capital and optimal capital structure, which is composed of the following sources and target market value proportions:

Source of Capital	Target Market Proportions	After-Tax Cost
Long-term debt	40%	6%
Preferred stock	10	11
Common stock equity	50	15

    a. Calculate the weighted average cost of capital.

10. Promo Limited has compiled the following financial data:

Source of Capital	Book Value	Market Value	Cost
Long-term debt	$10,000,000	$8,500,000	5.0%
Preferred shares	$1,000,000	$1,500,000	14.0
Common equity	$9,000,000	$15,000,000	20.0
Total	$20,000,000	$25,000,000	

    a. Calculate the weighted average cost of capital using book value weights.

    b. Calculate the weighted average cost of capital using market value weights.

Unit summary

Summary

In this unit you learned:

- about the concept of the cost of capital,

- how to arrive at the cost of debt,

- how to arrive at the cost of preferred shares,

- that there are various methods in how to arrive at the cost of ordinary shares, and

- about the concept of the weighted average cost of capital and how it is calculated.

Unit 17

Capital investment

Introduction

This unit introduces you to the techniques of capital budgeting. The steps in the capital budgeting process are described, beginning with proposal generation and ending with follow-up, and the associated terminology is defined. Having established the investment process, both the sophisticated (net present value and the internal rate of return) and unsophisticated (average rate of return and payback period) capital budgeting techniques are discussed, with particular emphasis on the calculation and evaluation of the NPV and IRR in investment decisions.

The unit comprises three main sections, as follows:

1. The need for capital investment
2. The capital investment process
3. Capital investment appraisal techniques

Upon completion of this unit you will be able to:

Outcomes

- *Understand* the importance of capital budgeting in decision-making.
- *Understand* the motives for key capital expenditure and the steps in the capital budgeting process.
- *Explain* the different types of investment projects.
- *Explain* the evaluation techniques of investment proposals.
- *Understand* the importance of the concept and calculation of net present value and internal rate of return in decision-making.
- *Explain* the advantages and disadvantages of the payback method and accounting rate of return as techniques for initial screening of two or more competing projects.

Terminology

Terminology

Accounting rate of return (ARR):	The rate of return of a project calculated by dividing the average annual profits by the average book value of the investment.

Capital budgeting:	The process of evaluating and selecting long-term investments consistent with the firm's goal of maximising owner wealth.
Discounted payback period (DPP):	The exact amount of time required for a project to recover its initial investment from its discounted annual net cash inflows.
Internal rate of return (IRR):	The discount rate that equates the present value of the net cash inflows with the initial investment associated with a project, thereby causing NPV = $0.
Net present value (NPV):	A capital budgeting technique, found by subtracting a project's initial investment from the present value of its net cash inflows discounted at a rate equal to the firm's cost of capital.
Payback period (PP):	The exact amount of time required for a firm to recover its initial investment as calculated from annual net cash inflows.
Profitability index (PI):	Ratio of the present value of annual net cash inflows to the initial investment in a project.

The need for capital investment

Capital investment (or capital budgeting) is the planning process used to determine whether a firm's long term investment in such things as new machinery, replacement machinery, new plants, new products, and research development projects are worth pursuing. It is a budget for major capital investment or expenditures.

A capital investment project can be distinguished from current expenditures by two features:

1. such projects are relatively large, and

2. a significant period of time (more than one year) elapses between the investment outlay and the receipt of the total benefits of the investment.

Capital investment process

When assessing the need for capital investment most organisations have a formal process for the identification and evaluation of these projects. A typical process could be:

1. select potential project(s),

2. perform an evaluation of the project(s),

3. analyse any non-quantifiable factors,

4. decide whether to accept or reject the project,

5. manage the project during its implementation,

6. perform a post-completion audit or project review, and

7. analyse variances from budget.

Selection of potential projects

In this section we consider how the initial selection of potential projects (before the evaluation takes place) should occur. One of the important relationships to consider is the relationship between capital projects and the strategic plan.

Proposed projects have to be consistent with the organisation's goals and strategies. By considering strategic issues we recognise that adding value to the organisation is not just the cash flows from the project, but also hidden values when the project assets are combined with other assets of the organisation.

There are numerous planning models that can be used to align capital projects with the strategic goals of the organisation.

Once a project has been approved, it is necessary to develop appropriate administrative procedures to undertake the project and to monitor its progress. This requires the development of a timetable for the project's completion. The time taken to complete a project is of great importance since any delay in its completion is likely to result in greater cash outflows and delays (reduction) in cash inflows. Such delays may affect the overall profitability of the project.

Capital investment proposals

Each project in a capital budget normally requires a separate capital expenditure proposal (or capital request form) to be approved.

A long-term project proposal would typically include:

- a brief description of the proposal,

- a statement indicating why the project is desirable or necessary,

- an estimate of the amount and timing of the cash flows,

- an estimate of when the proposal will come into operation, and

- an estimate of the project's economic life.

Using the data obtained in the proposal, an economic or financial evaluation of the proposal is made, using techniques that are covered in the next section, such as net present value (NPV), internal rate of return (IRR), accounting rate of return (ARR) and payback.

Justification for undertaking the project

To be successful, the request should have the appropriate justification – not just that a project has a positive financial impact to the organisation.

In order to determine the appropriate justification, the reason for the project needs to be known and understood.

There can be many different reasons, but some major categories can be identified as follows:

Cost reduction

Cost reduction is a common reason when investments in advanced manufacturing technology are being considered. Here the focus is on the net present value number.

Compulsory replacement

Compulsory replacement as a reason is due to, for example, obsolete, faulty or permanently damaged equipment. In order to justify this type of project, more emphasis should be placed on comparative machines, that is, an analysis between alternatives. The decision of whether to invest or not does not need to be made – it is compulsory to invest. Therefore, measures like return on investment are not the critical justification for the project.

Non-quantifiable performance improvement

Replacing the existing computer network with more powerful computers has non-quantifiable benefits, but many companies do it because they perceive (probably quite correctly) that the project is worthwhile in terms of improved efficiency and so on.

New product introduction

The emphasis in the justification should be on implementing the strategic plan of the organisation or on the basis of growth, survival and/or improvement. The primary justification should be on the qualitative factors, because numbers are most open to criticism with new products (being based on estimates).

Adding more capacity

The request form should specify the most appropriate reason for the project. This will not always be the lowest cost alternative. Sometimes it will be the highest performance alternative.

Capital investment appraisal techniques

In this section we consider five basic methods of project appraisal.

- **Non-discounting methods,** which are payback, and accounting rate of return (ARR).

- **Discounted cash flow (DCF) methods**, which are net present value (NPV), internal rate of return (IRR) and an adaptation of the payback method known as discounted payback.

Simple non-discounting methods such as payback and ARR are often used in practice because they are easier to understand than discounted

cash flow methods like NPV and IRR, and because they may provide a filter for projects.

However, discounting methods are necessary when evaluating long-term projects as they allow for the time value of money.

A reminder that the time value of money means that, in a period of positive interest rates, one dollar received or paid in the future is not worth as much as one dollar received or paid today. This is because the dollar received or paid today could be invested to earn interest. Assuming simple interest at a rate of 10 per cent per annum and no taxes:

- one dollar received today is worth one dollar plus ten cents in one year's time, which implies that:

- one dollar received in one year's time is worth only $1/1.1 = $0.91 at today's value. We say the value of the dollar has been *discounted* to $0.91.

This means that for projects that generate cash flows far into the future, we cannot just add future cash flows into our analysis at their face (or nominal) value. We should discount them first so that all the numbers in the calculation have the same value, which is called the present value.

Non-discounting methods

Payback method

The payback period of a project is calculated by counting the number of years that it takes for cumulative, forecast net cash flows to equal the initial investment. In order to use the payback rule an organisation has to decide on an acceptable length of time for projects to pay back their initial investment, that is, the cut-off date. Projects are undertaken if they "pay back" their initial investment cost on or before the cut-off date.

The acceptable length of time will be dependent upon the organisation's internal rules. So some organisations may accept projects with a three-year payback, some may accept a five-year payback whereas some will accept other payback periods. There is no generally accepted rule for a minimum or maximum length of time.

When the future cash inflows are of the same nature and amount and at equal intervals (in other words, they are uniform), the payback is calculated as follows:

$$\text{Payback} = \frac{\text{Initial investment}}{\text{Net cash inflow per period}}$$

When the cash flows are not uniform, the total payback period can be calculated by:

a. subtracting the period cash inflows from the amount of the initial investment until the next period cash inflow will cover all the remaining investment, and counting the number of periods;

b. dividing the remaining investment amount by that last period cash flow to determine the fraction of the period when the total investment is recovered; and

c. adding (a) and (b).

Case study/example

A new machine that wraps newspapers in plastic wrapping is being considered by a newspaper business. There are two possibilities for future net cash inflows. The first is that after an initial investment of $6,000,000 the cash inflows will last for ten years at $800,000 per year. The second is after an initial investment of $6,000,000 the cash inflows will last for six years as follows:

Year	1	2	3	4	5	6
	$000	$000	$000	$000	$000	$000
Cash inflow	2,000	1,800	1,400	1,200	600	300

Determine the payback under each assumption.

The payback under the first cash flow assumption is:

$6,000,000/$800,000 years

= 7½ years (seven years and six months)

The payback under the second cash flow assumption is

a. The table shows that the investment will be recovered in just over three years.

Year	0	1	2	3	4
	$000	$000	$000	$000	$000
Investment outlay	– 6,000				
Cash inflow		2,000	1,800	1,400	1,200
Accumulated cash flow	– 6,000	– 4,000	– 2,200	– 800	400

b. To determine the time during the fourth year that we expect recovery we calculate as follows:

$$\frac{\text{Investment still to be recovered}}{\text{Net cash inflow for the period}}$$

= $800,000/$1,200,000

= 0.67 years or eight months

c. Total payback time is therefore three years and eight months.

Under payback the second pay-off is preferred because the payback period is shorter.

The first pay-off generated a total of $8 million cash and the second generated a total of $7.3 million cash. However, under the payback method, cash flows after the investment cost is recovered are ignored.

The payback method has a number of advantages from the company's strategic perspective. A company would be likely to suffer cash flow problems if all investment decisions generated their returns in the distant future. The payback method focuses on liquidity risk: the risk that a firm will be short of cash in a particular period. Projects with short paybacks have less liquidity risk than projects with longer paybacks, because the cash outflow for the project is recovered in a shorter time.

However, while the payback method is a simple, intuitive method for screening proposals, it ignores both the time value of money and the cash flows that may be received beyond the payback period.

Too much emphasis on short-term returns may mean a company foregoes the opportunities that may be associated with longer-term projects. For this reason, the payback method is often used in conjunction with other investment appraisal methods. An alternative to the payback method is the discounted payback method which is discussed later in this unit.

Accounting rate of return (ARR)

The accounting rate of return (ARR) method focuses on the incremental (or additional) accounting profit that results from a project. As accounting profit is based on the accrual concept, this is the only method that includes accruals in the calculation of project returns.

For example, if a project is expected to generate credit sales in year one that are not expected to be paid until the following year, the sales revenue is included in year one under ARR. Under the other methods, it is the expected cash receipt from the sale that is used, and it would be included in year two returns.

This makes no difference when we are evaluating a project over its total life but it may make a difference when calculating the ARR for each year of the project. The general formula is as follows:

$$ARR = \frac{\text{Average incremental revenue} - \text{Average incremental expenses (including depreciation and tax)}}{\text{Initial or average investment}}$$

There are two main ways to calculate the denominator in the ARR. The first is to use the initial investment and the second is to use the average investment. A project's average investment is the average accounting book value over the project's life:

$$\text{Average investment} = \frac{\text{Initial investment} + \text{Salvage value}}{2}$$

Case study/example

Chong Limited is evaluating the possibility of introducing a new product. The project requires an investment of $1,000,000 including design, promotion, and new equipment. The project is expected to yield $300,000 of additional revenue per year and to incur operating expenses of $80,000 per year in addition to $60,000 annual depreciation. The life of the product is five years and will have a nil salvage value at the end of five years.

Determine the accounting rate of return,

    a.   using initial investment

    b.   using average investment.

Solution

Incremental income:

Revenue		$300,000
Less:		
Operating expenses	$80,000	
Depreciation expense	60,000	$140,000
Incremental income (profit)		$160,000

a.

$$ARR = \frac{\text{Incremental income}}{\text{Initial investment}}$$

$$= \$160,000/\$1,000,000$$

$$= 16\%$$

b.

$$\text{Average investment} = \frac{\text{Initial investment + Salvage value}}{2}$$

$$= \frac{\$1,000,000 + \$0}{2}$$

$$= \$500,000$$

$$ARR = \frac{\text{Incremental income}}{\text{Average investment}}$$

$$= \$160,000/\$500,000$$

$$= 32\%$$

The advantage of the accounting rate of return measure is that it uses the same numbers that managers use for their own divisional performance appraisals. The main disadvantages of the ARR technique are that it ignores the time value of money and that the numbers can be manipulated by management using selective accounting policies.

Limitations of non-discounting methods

Non-discounting methods do not include the effects of the time value of money. They assume that one dollar earned (or incurred) next year has the same value as one dollar earned (or incurred) in, say, six years' time. When evaluating long-term projects, non-discounting techniques become less useful for assessing the profitability of a capital project the longer the time frame of the project.

Despite this serious flaw, many entities use non-discounting techniques because they have the advantage that they are very easy to understand. For example, if a manager is told that it takes three years and six months for a project to generate net cash flows that will recover the cost of the original investment, it is a fairly easy concept to understand.

Another reason why some managers might base their capital investment decisions on payback is because they may have a more short-term focus than shareholders. If managers assume that they will change jobs relatively frequently, they may consider only the benefits they can provide to the organisation (and those they can get from it) during their period of employment.

Shareholders, on the other hand, ought to value their shares based on expectations of future cash flows in perpetuity. All capital projects would then be taken into account by the capital market when pricing a share. Therefore, to maximise their wealth, shareholders would want managers to invest in all value-adding projects, not just projects that have short-term benefits.

Discounting methods

Introduction

If a capital expenditure proposal is to be profitable, it must generate net cash flows that increase value, otherwise there is no point entering into the project. Value will only be increased if the net cash flows satisfy the rate of investment return demanded by the capital contributors to the entity, that is, the equity investors (shareholders) and lenders. Therefore the discounting methods are based on project net cash flows, and an allowance for the "cost" of funds provided to the firm by shareholders and lenders.

Net present value (NPV)

A project's net present value is calculated by discounting all net cash flows generated by the project to their present values. The most common pattern of cash flows is an initial investment cash outflow (negative cash flow) followed by a number of cash inflows (positive cash flows) until the end of the project's life. However, the method can be applied to any stream of cash flows.

Four steps make up a project appraisal using net present value:

1. Estimate the cash flows for each period of the project.

2. Calculate the present value of each period net cash flow, using a discount rate that reflects the risk of the project (this is known as the "cost of capital").

3. Sum the present values of the cash flows – this is the net present value.

4. Evaluate the proposal.

If the cash flow amounts are uniform (for example, all positive cash flows of equal amount occurring at equal intervals apart), steps (2) and (3) can be shortened by using annuity factors.

The net present value of a project can be expressed as a formula:

$$NPV = C_0 + \sum_{t=1}^{n} \frac{C_t}{(1+r)^t}$$

Where:

- NPV = net present value
- C_t = net cash flow in period t
- C_o = initial net cash flow (at time zero)
- n = length of project life
- r = required rate of return

If the net present value is positive, this means that the project is acceptable on quantifiable grounds because it will add value to the entity undertaking the project. However, financial information is only one input into a project acceptance decision; strategic or other qualitative issues may carry equal or even greater weight in management decisions.

If the NPV is negative, the project should not be accepted (based only on quantifiable grounds), because the project will reduce entity value.

If the NPV equals zero the entity's value will not change by accepting the project and the entity would be indifferent to accepting the project.

The NPV decision rules can therefore be represented as follows:

Sign of NPV	Decision
+	Accept project
0	Indifferent
-	Reject project

Figure 1

A further extension of the NPV method is to calculate the profitability index (PI). This is calculated by dividing the gross present value of the project by the investment outlay. Any project having a positive NPV will have a PI of greater than 1.00. The PI is useful for comparing two or more projects with differing investment outlays.

Case study/example

Anderson Limited is considering a new project which requires an immediate outlay of $8.714 million and will produce estimated inflows over the next few years of $4 million in year 1, $3 million in each of years 2 and 3, $1 million in year 4, $750,000 in year 5 and $500,000 in year 6. The cost of capital, taking into account the risk of the project, is estimated at 10 per cent per annum.

   a.   What is the NPV of the project?

   b.   What is the PI of the project?

   c.   Based on NPV and PI, should the company proceed with the new project?

Solution

a.

Year	Cash $000	10% discount factors	Present value $000	Gross PV $000
0	− 8,714	1.000	− 8,714	
1	4,000	0.909	3,636	3,636
2	3,000	0.826	2,478	2,478
3	3,000	0.751	2,253	2,253
4	1,000	0.683	683	683
5	750	0.621	466	466
6	500	0.564	282	282
		NPV =	1,084	9,798

   b.   The PI = 9,798 / 8714 = 1.124

   c.   On the basis of the estimates given, the project appears to be financially worthwhile, having a positive net present value of $1,084 million, implying that the wealth of the company's shareholders should increase by that amount. This is also reflected in the PI of 1.124. Therefore, based on NPV and PI the company should proceed with the new project.

Internal rate of return

A project's internal rate of return (or time-adjusted rate of return) is the actual economic return earned by the project over its life. Another way of stating this is that a project's internal rate of return (IRR) is the discount rate that would result in a net present value of zero for the project.

These are the three steps to calculate the IRR:

   1.   Prepare a table showing the cash flows during each period of the proposed investment.

   2.   Using the NPV formula and method, and the cash flows, determine the r value, which gives a NPV equal to zero. This is usually done automatically by calculator or computer, although tables and a trial and error approach can be used.

   3.   Evaluate the project.

The IRR of each project under consideration is compared to a desired rate of return (often the weighted average cost of capital). Projects that don't achieve the required rate would be rejected and those that do meet the required rate would be accepted.

The IRR decision rules can therefore be represented as follows:

Condition	Decision
IRR > cost of capital	Accept project
IRR = cost of capital	Indifferent
IRR < cost of capital	Reject project

Figure 2

Case study/example

Using the data given in the Anderson Limited example above, calculate the IRR of the project. Based on IRR, should the company proceed with the new project?

Solution

Using trial and error, the IRR is found to be 16 per cent.

Year	Cash $000	16% discount factors	Present value $000
1	-8,714	1.000	– 8,714
2	4,000	0.862	3,448
3	3,000	0.743	2,229
4	3,000	0.641	1,923
5	1,000	0.552	552
6	750	0.476	357
	500	0.410	205
		NPV =	0

As IRR is greater than the cost of capital (16% > 10%), the company should proceed with the new project.

Comparison of NPV and IRR

When deciding whether to accept or reject a single project, the NPV and IRR methods give identical recommendations because if the IRR is higher than the cost of capital, the NPV will automatically be positive.

For ranking competing projects, the NPV method is generally preferred over the IRR method. The latter can give incorrect rankings, particularly when the projects are of different sizes, because it measures the rate of return rather than the absolute gain that each project offers the shareholders. A high rate of return on a small project can be worth less than a lower rate of return on a big project.

Case study/example

Monty Limited is considering two alternative additions to its current manufacturing process. Each of the alternatives would require an initial cash outlay of $1 million. The expected after-tax cash flows are as follows:

Year	Alternative 1	Alternative 2
1	0	370,000
2	200,000	370,000
3	600,000	370,000
4	900,000	370,000

The company's cost of capital is 12 per cent.

    a.   Calculate the NPV and IRR for each alternative.

    b.   Which alternative should the company choose and why?

Solution

NPV calculation:

Year	12% discount factors	Present Value Alternative 1	Present Value Alternative 2
0	1.000	−1,000,000	−1,000,000
1	0.893	0	330,410
2	0.797	159,400	294,890
3	0.712	427,200	263,440
4	0.636	572,400	235,320
NPV		$159,000	$124,060

The NPV indicates that alternative 1 should be chosen.

IRR calculation:

Using trial and error, the IRR is determined to be 17.0 per cent for alternative 1; 17.8 per cent for alternative 2. Using IRR, alternative 2 would be chosen.

Alternative 1 should be chosen, as the total increase in wealth for the company will be $159,000 (as shown by the NPV). Although the IRR shows a higher return for alternative 2, this is a relative profitability measure, which does not show how much the value of the firm will change for each project.

Discounted payback method

This is the same as the payback method except the cash flows are discounted to their present values before subtracting them from the initial investment cost.

Case study/example

Using the data and present values from the Anderson Limited example above, calculate the discounted payback of the project. How long will it take to recover the initial outlay?

Solution

Year	Present value of cash inflow $'000s	Accumulated present value $'000s
0	-8,714	-8,714
1	3,636	-5,708
2	2,478	-2,600
3	2,253	-347
4	683	336
5	466	802
6	282	1,084

Figure 3

The table shows that the investment will be recovered in just over three years.

To determine the time during the fourth year calculate as follows:

$$\frac{\text{Investment still to be recovered}}{\text{Net cash inflow for the period}}$$

= \$347,000/\$683,000

= 0.508 years or about six months

Total payback time is therefore three years and six months.

Uncertainty and sensitivity analysis

In all of the techniques that have been discussed in this Unit there is an element of uncertainty about a number of variables that are assessed when making decisions. In any prediction or projection about future events there is a risk that the actual outcome is materially different to the one anticipated.

Two approaches are sometimes used for dealing with project risk to capture the variability of cash inflows and NPVs: sensitivity analysis and scenario analysis.

Sensitivity analysis

This technique uses several possible values for a given variable, such as net cash inflows, to assess its impact on the firm's return, measured by NPV. This technique is often useful in getting an understanding of the variability of return in response to changes in a key variable. One of the most common sensitivity approaches is to estimate the NPVs associated with pessimistic (worst), most likely (expected) and optimistic (best) net

cash inflow estimates. The range can be determined by subtracting the pessimistic outcome NPV from the optimistic outcome NPV.

Scenario analysis

This technique is related to sensitivity analysis but broader in scope. It evaluates the impact on the firm's return of simultaneous changes in a number of variables, such as cash inflows and the cost of capital.

For example, the firm could evaluate the impact of both high inflation (scenario 1) and low inflation (scenario 2) on a project's NPV. Each scenario will affect the firm's cash inflows, cash outflows and cost of capital, thereby resulting in different levels of NPV. The decision-maker can use these NPV estimates to assess the approximate risk involved with respect to the level of inflation.

Activity 7.2

Activity

1. What is capital investment (budgeting)? Do all capital expenditures involve non-current assets? Explain.

2. What weaknesses are commonly associated with the use of the payback period to evaluate a proposed investment?

3. What are the acceptance criteria for NPV? How do they relate to the firm's market value?

4. Do the NPV and IRR always agree with respect to accept-reject decisions? With respect to ranking decisions? Explain.

5. State the decision criteria applied when using the accounting rate of return, profitability index and discounted payback period methods to evaluate capital expenditure projects. What are the major limitations in using these methods to evaluate capital expenditure projects?

6. New Limited has a five-year maximum acceptable payback period. The firm is considering the purchase of a new machine and must choose between two alternatives. The first machine requires an initial investment of $14,000 and generates after-tax net cash inflows of $3,000 for each of the next seven years. The second machine requires an initial investment of $21,000 and provides an annual cash inflow after taxes of $4,000 for 20 years.

   a. Determine the payback period for each machine.

   b. Comment on the acceptability of the machines, assuming they are independent projects.

   c. Which machine should the firm accept? Why?

   d. Do the machines in this problem illustrate any of the weaknesses of using payback? Discuss.

7. Given the information in the following table and 15 per cent cost of capital:

a. Calculate the net present value.

b. Explain whether or not the project should be accepted.

Operating Cash Inflows				
$1,000	$1,000	$1,000	$1,000	$1,000
Yr1	Yr2	Yr3	Yr4	Yr5

$2,500
(Initial outlay)

8. A project requires an initial outlay of $100,000 and it will generate cash inflows of $25,000 in Year 1, $10,000 in Year 2, $50,000 in Year 3, $10,000 in Year 4, $10,000 in Year 5 and $60,000 in Year 6. The firm's cost of capital is 15 per cent.

   a. Calculate the net present value.

   b. Explain whether or not the project should be accepted.

9. Tungsten Oil Company is considering investing in a new exploration project. The firm's cost of capital is 12 per cent and the project is expected to have an initial after tax cost of $5,000,000. Furthermore, the project is expected to provide after-tax operating cash flows of $2,500,000 in year 1, $2,300,000 in year 2, $2,200,000 in year 3 and ($1,300,000) in year 4.

   a. Calculate the project's NPV.

   b. Calculate the project's IRR.

   c. Should the firm make the investment?

Unit summary

Summary

In this unit you learned:

- the need for capital investment
- the capital investment process
- the various capital investment appraisal techniques.

Unit 18

Short-term and long-term finance

Introduction

This unit introduces the fundamentals and describes the interrelationship of net working capital, profitability, and risk in managing the firm's current asset accounts. The unit then focuses on the management of three major current asset accounts – cash, accounts receivable and inventory. The key aspects of accounts receivable management are discussed. Also discussed are the impacts of changes in cash discounts. The unit concludes with a brief discussion of some aspects of equity finance and the role of intermediate financial institutions.

The unit comprises five main sections:

1. An explanation of working capital
2. Source and cost of working capital
3. Managing cash
4. Raising equity
5. Intermediate financial institutions

Upon completion of this unit you will be able to:

Outcomes

- *Understand* short-term financial management, net working capital, and the related trade-off between profitability and risk.
- *Describe* the cash conversion cycle, its funding requirements, and the key strategies for managing it.
- *Discuss* inventory management.
- *Describe* the procedures for quantitatively considering cash discount changes.
- *Understand* the management of receipts and disbursements.
- *Understand* the role of intermediate financial institutions.

Terminology

Terminology

Cash conversion cycle:	The amount of time a firm's resources are tied up, which is calculated by subtracting the average payment period from the operating cycle.
Cash discount period	The number of days after the beginning of the

credit period during which the cash discount is available.

Economic order quantity model:	An inventory management technique for determining an item's optimal order quantity, which is the one that minimises the total of its order costs and carrying costs.
Initial public offering:	The first public sale of a firm's shares.
Operating cycle:	The time from the beginning of the production process to the collection of cash from the sale of the finished product.
Venture capital:	Privately raised external equity capital normally used to fund early-stage firms with attractive growth prospects.
Working capital:	Current assets, which represents the portion of investment that circulates from one form to another in the ordinary conduct of business.

Working capital explained

Working capital management refers to the decisions and strategies concerning amounts and types of investment in current assets and amounts and types of financing from current liabilities. The daily activities of the company result in a flow of cash through the working capital accounts.

Working capital management involves the analysis of the risk-reward relationship. Working capital decisions affect many of the financial ratios used to evaluate financial conditions. In addition, the risk associated with working capital strategies may influence the company's cost of capital. Also, working capital can be positively or negatively impacted by a company's credit and cash management practices. For example, use of controlled disbursement and concentration of excess balances has an impact on working capital management, as well as on the credit and collection departments.

Working capital policy is defined as basic policy decisions regarding the amounts invested in each category of current assets and how these amounts will be financed. During periods of economic uncertainty the working capital management policies of many firms shift to the higher maintenance level of cash balances even though some cash may be regarded as idle cash by function. The "costs" of missing profitable opportunities by utilising available cash balances are now regarded as crisis prevention costs, although these are actually opportunities losses only.

Source and cost of working capital

Inventory management

Inventory management is generally the direct responsibility of the business operations units, although the treasurer of a company is usually responsible for the financing of the inventory. The way that inventory is managed will determine the amount of inventory that is carried by the company, and therefore the amount of financing that is provided. The ability to use inventory as collateral for a loan is directly related to the type of the inventory and how it is managed.

The inventory carried by the company is tied into its production and sales activities, which are responsible, in turn, for the majority of the company's cash flows. How inventory is managed will affect the length of the company's cash flow cycle and the estimation of cash flows. This will have an impact on both the type of cash flow forecasting that the company can employ and its accuracy. The timing and uncertainty of cash flows also affects the company's liquidity needs and, potentially, how that liquidity is maintained.

Economic order quantity

Economic order quantity (EOQ) is that size of the order which gives maximum economy in purchasing any material and ultimately contributes towards maintaining the materials at the optimum level and at the minimum cost.

In other words, the economic order quantity (EOQ) is the amount of inventory to be ordered at one time for purposes of minimising annual inventory cost.

The quantity to order at a given time must be determined by balancing two factors:

1. the cost of possessing or carrying materials, and
2. the cost of acquiring or ordering materials.

Purchasing larger quantities may decrease the unit cost of acquisition, but this saving may not be more than offset by the cost of carrying materials in stock for a longer period of time.

The carrying cost of inventory may include:

- interest on investment of working capital,
- property tax and insurance,
- storage cost and handling cost,
- deterioration and shrinkage of stocks, and
- obsolescence of stocks.

The basic inventory management model is the economic order quantity (EOQ) model:

$$EOQ = \sqrt{\frac{2DP}{C}}$$

Where:

- D = demand in units for a specified time period.

- P = relevant ordering costs per purchase order.

- C = relevant carrying costs of one unit for the time period used for D.

In more sophisticated versions of the model, stock-out costs are added.

The underlying assumptions of this model are:

- The ordering cost is constant.

- The rate of demand is constant.

- The lead time is fixed.

- The purchase price of the item is constant, that is, no discount is available.

- The replenishment is made without delay and the whole batch is delivered at once.

Case study/example

Portland Limited runs a mail-order business for construction equipment. Annual demand for a small concrete mixer is 16,000. The annual holding cost per unit is $2.50 and the cost to place an order is $50.

Calculate the economic order quantity.

Solution

$\sqrt{(2 \times 16,000 \times \$50)/\$2.50}$ = 800 units

Receivables and payables management

Accounts receivable and accounts payable arise out of the normal sales and purchasing activities of a business. In most companies, receivables and payables represent, respectively, a significant inflow and outflow of funds.

Accounts payable are a major source of funds for many companies. Similarly, accounts receivable are the major working capital item (as well as the primary form of security for short-term borrowing) for the majority of companies. The accountant, however, is often not consulted until the marketing and purchasing decisions have already been made. Furthermore, marketing and purchasing personnel may not adequately

understand and include financial considerations in their negotiations with customers and vendors.

In most situations, the non-financial dimensions of the sales and purchasing decisions (competitive pricing, delivery, product quality and so on) are very important. However, normal financial procedures and concepts should also play a role in these decisions. In most companies, credit policy is viewed as a marketing tool, and decisions are dominated by the competitive situation and by marketing personnel. Collection and monitoring of the resulting accounts receivable are the function of the credit manager. The accountant should interact with these and other appropriate individuals to forecast cash inflows from accounts receivable and to obtain financing necessary to support the resulting level of accounts receivable.

Discounts

There are many different types of discounts and they can occur at any point in a company's distribution channel. There are also many purposes for discounting, including: to increase short-term sales, to move out-of-date inventory, to reward valuable customers, to encourage distribution channel members to perform a function, to encourage the early receipt or payment of cash, or to otherwise reward behaviour that benefits the discount issuer. Some discounts and allowances are forms of sales promotion.

We will look at one particular discount – the cash discount. This is a reduction in price given by the creditor (supplier) to the debtor (customer). This discount is intended to speed payment and thereby provide liquidity to the firm. They are sometimes used as a promotional device.

Examples of this type of discount include:

- **2/10 net 30:** This means the buyer must pay within 30 days of the invoice date, but will receive a 2 per cent discount if they pay within 10 days of the invoice date.

- **3/7 EOM:** This means the buyer will receive a cash discount of 3 per cent if the bill is paid within seven days after the end of the month indicated on the invoice date. For example, if an invoice is received on or before the 25th day of the month, payment is due on the seventh day of the next calendar month. Alternatively, if an invoice is received after the 25th day of the month, payment is due on the 7th day of the second calendar month.

- **3/7 EOM net 30:** This means the buyer must pay within 30 days of the invoice date, but will receive a 3 per cent discount if they pay within seven days after the end of the month indicated on the invoice date. For example, if an invoice is received on or before the 25th day of the month, payment is due on the 7th day of the next calendar month. If an invoice is received after the 25th day of the month, payment is due on the 7th day of the second calendar month.

- **2/15 net 30 ROG:** This means the buyer must pay within 30 days of receipt of goods, but will receive a 2 per cent discount if paid

in 15 days of the invoice date (ROG is short for "receipt of goods").

Opportunity cost of not taking a discount

An opportunity cost is the net revenue lost by rejecting an alternative action. A firm should typically take advantage of a discount offered by a creditor because of the associated high opportunity cost.

For example: if the terms of sale are 2/10, net/30, the customer has 30 days to pay the bill but will get a 2 per cent discount if the invoice is paid in 10 days.
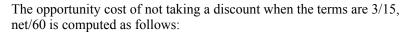
The following formula may be used to compute the opportunity cost in percentage, on an annual basis, of not taking a discount:

Opportunity cost = [discount per cent / (100 x discount per cent)] x 360/N

Where:

- N = the number of days payment can be delayed by forgoing the cash discount = days credit is outstanding - discount period.

The numerator of the first term (discount per cent) is the cost per dollar of credit, whereas the denominator (100 discount per cent) represents the money made available by forgoing the cash discount. The second term represents the number of times this cost is incurred in a year.

Case study/example

The opportunity cost of not taking a discount when the terms are 3/15, net/60 is computed as follows:

Opportunity cost = [3 / (100 - 3) x 360]/ (60 – 15)

$$= [3/ 97] \times [360/ 45] = 24.7\%.$$

Managing cash

Cash management is the art of having the right amount of cash in the right place at the right time. It involves the total management of the organisation's assets and liabilities and the raising of funds to finance a business. It is one reason why an organisation must decide whether the treasury operation should be centralised or decentralised.

Cash flow control is the management of cash receipts and payments, cash balances and cash transfers between different parts of the business. It helps to ensure that a business remains liquid and can meet its payment obligations when they fall due. Liquidity, in this context, refers to cash in hand and convertibility of assets into cash.

Cash conversion cycle

The cash conversion cycle refers to the length of time between when a company makes payments and when it receives cash inflows. The cash conversion cycle is calculated as follows:

a. CCC = inventory conversion period + receivables collection period – payables payment period.

b. Inventory conversion period = average inventory ÷ cost of goods sold per day.

c. Receivables collection period = average receivables ÷ sales per day.

d. Payables deferral period = payables ÷ purchases per day.

Note: Inventory conversion days + receivables collection period is known as the operating cycle (OC).

Case Study/Example

Minnie Limited has sales of $20,000,000, average inventories of $2,191,781, cost of goods sold of $16,000,000, average receivables of $1,095,890 and average accounts payable of $1,315,068. The following calculations can be performed:

- Inventory conversion period = $2,191,781 ÷ ($16,000,000 / 365) = 50 days.

- Receivables collection period = $1,095,890 ÷ ($20,000,000 / 365) = 20 days.

- Payables deferral period = $1,315,068 ÷ ($16,000,000 / 365) = 30 days.

- Cash conversion cycle = 50 + 20 – 30 = 40 days.

This CCC can then be compared with previous years or a budgeted period or industry statistics to establish if the CCC is acceptable or not.

The longer the CCC, the greater the financing requirements are for an organisation and the greater the financial risks. So for this reason an organisation is likely to want to reduce the CCC to a minimum, if possible.

Changes in any of the time periods will change the resources tied up in operations. For example, if Minnie could reduce the average collection period on its accounts receivable by five days, it would shorten the cash conversion time line and therefore reduce the amount of resources Minnie would need to invest in operations. For Minnie, a five-day reduction in the average collection period would reduce the resources invested in the cash conversion cycle by $273,973 ($20,000,000 x (5/365)).

Cash flow and profitability patterns

Cash flow can be understood in terms of:

- operating cash flow,

- investing cash flow, and

- financial cash flow.

Operating cash flow can be defined as the cash generated as a result of a company's operations. For a defined period, operating cash flow is the amount of cash produced from a company's revenues after the cost of goods sold and other operating costs, including income tax, are deducted, and after allowing for movements over that period in working capital (current assets minus current liabilities).

Investing cash flow relates to the acquisition and disposal of non-current assets such as plant and machinery, land and buildings, intangibles and investments.

Financial cash flow relates to net cash flow generated as a result of:

- the capital structure of the business in the form of interest and dividends paid and net movements in equity and debt, and

- the investment in non-operating assets.

It is a basic rule of sound financial management that a business should aim to generate positive operating cash flow. This means that all essential payments such as payments to suppliers and payment for wages and salaries should be made out of the cash flow generated by the company's operations.

Cash flow statements and forecasts are important to lenders because they expect business to meet their essential payments of principle and interest from operating cash flow. In some circumstances, cash flow statements can be more reliable than profit statements because they record movements of cash in and out of the company from its daily operational activities.

Operational cash flows are associated with a company's normal trading activities. A positive operating cash flow is nearly always needed to sustain the business operations. Any remaining surpluses are then available to contribute to the financial cash flow of the company.

Financial cash flow is mainly associated with:

- debt servicing, that is, the ability to meet interest and principal repayments as they fall due;

- discretionary cash flows including dividends, money market and trade investments, acquisitions, disposals of non-operating assets and investments and research expenditure and investments;

- outside funding such as short-term debt, term debt and equity issues; and

- interest and other income from money market and trade investments.

Cash flow management

The aim of cash flow management is to develop the process that will ensure that the company business is kept in a healthy state. Cash flow management involves having up-to-date knowledge of receipts and payments and a strategy for maintaining liquidity. Cash flow

management cannot be used in isolation to the management of the overall business. It must be used in conjunction with the other key areas including production, marketing, strategic planning, accounting and human resources.

Accounting standards requiring companies to include cash flow statements in their annual set of financial statements has provided closer scrutiny of corporate cash flows. A particular concern for securities analysts is the size of cash flows from operations in comparison with investing and financing cash flows.

Techniques used to improve cash flow management are listed below.

Techniques for improving cash receipts

These include:

- Increase sales (cash and credit). Review the marketing plan for its suitability and review the opportunity to increase market share within tolerable credit risk.

- Increase profit margins. Can prices be increased and still remain competitive? Can manufacturing and service costs be reduced?

- Improve receivable collection procedures. How quickly are debtors followed up and can this be improved?

- Reduce credit limits to customers. Encourage customers to pay existing outstanding amounts.

- Improve invoicing. Send an invoice with the goods and any part orders rather than waiting until the end of the month to invoice. How soon are customers billed?

Techniques for improving cash payments

These include:

- Control all purchases. Order smaller quantities more frequently as far as possible. Ordering "just in time" can free funds otherwise tied up.

- Seek better discounts and profit margins. Are you receiving the best possible deal from suppliers?

- Rank accounts payable according to their due date. Nothing is gained by paying too early, but you should adhere to creditors' time limits.

- Seek to extend the credit period. Many creditors do not charge interest, banks do.

- Reduce or delay capital expenditure without materially affecting capital reinvestment plans or asset replacement cycles.

- Review or develop financial ratios on inventory turnover, expenditures and sales. This will help identify areas that need attention.

- Minimise overtime and other staff costs. Monitor productivity of staff, their salaries and minimise unnecessary overtime.

Techniques for improving funding

These include:

- Consider re-financing loans or re-negotiating terms. Can several short term liabilities be amalgamated into one longer-term debt? Can better interest rates be negotiated? Can interest be fixed for a longer period if interest rates are historically low?

- Can non-current assets be more effectively financed or used? Examine sale and lease-back arrangements of non-current assets.

- Are banking relationships sound? Have you established a good working relationship with the bank manager? Do you keep your bank manager informed beforehand of likely adverse developments?

Use of surplus funds

In some cases, effective cash management techniques may result in surplus funds. If the surplus is expected to be short-lived, as in the case of a surplus in a seasonal business, the excess may be invested in the short-term money market. Although marketable securities typically provide much lower yields than investments in operating assets, they are preferable to simply holding cash in a bank account earning little or no interest.

If the cash surplus is expected to be long term, consideration may be given to dealing with the surplus by either investing in business expansion or returning cash to shareholders by way of a special dividend.

Danger points in cash flow management

Growing businesses put strong pressure on cash flow. As a business grows it usually requires capital investment and an increasing level of inventory and accounts payable balances. These are, in turn, paid out of operating cash flow. If expansion is too rapid, operating cash flow can become negative. When this happens, the business is no longer meeting its essential payments. It can occur even if the business is trading at a profit, as the cash expenditures are required well before any increased credit sales are realised as cash.

The situation described above is often referred to as *overtrading.* That is, a company may try to support too great a volume of trade from too small a working capital base – it may enter into commitments greater than its available short-term resources.

This is a situation that makes banks and other lenders wary. They refer to this situation as overtrading, undercapitalising, outstripping the asset base, and so on. Banks are normally unwilling to lend or continue to lend in this situation because:

1. operating cash flow is negative, and

2. there is usually limited additional collateral (security) that can be made available.

Consequently, once a business is overtrading, banks may squeeze on credit and reduce available lines of credit. The business may need to restructure to avoid severe financial difficulty.

Overtrading can largely be avoided with careful planning and good financial discipline. When the business plan is prepared, limits should be established for the levels of inventory and accounts receivable. These limits should be set so that any planned increase in working capital is within cash flow and financing capacity. This may lead to reducing planned growth and sales. If such an important change in strategy is required, changes to the business plan are likely to be necessary.

If overtrading does occur, there are strategies that may be adopted to deal with it, including:

- Reduce business activity to consolidate and give some breathing space.

- Introduce new equity capital rather than debt, to ease the strain on short-term resources.

- Drastically improve the management of working capital.

The need to avoid overtrading stresses the importance of forecasting cash flows, and the importance of applying financial discipline by adhering to pre-set limits.

Raising equity

We have already discussed a number of aspects of equity funding, that is, funds from owners of the business. In this section we will discuss some particular issues in raising equity.

Ordinary shares represent the ownership of the company, and management acts as their agent in the operation of the business. Different classes of shares may be issued, which may affect such things as voting rights and preferences and amounts of dividend payments. These rights will be considered when a shares issue is being decided.

Convertible debt

Convertibles are a hybrid and represent a combination of debt and equity components. They are usually issued as bonds that may be exchanged for shares at a predetermined price. Until they are converted, they pay an interest return. They offer the company the opportunity to sell debt at a lower interest rate, and the shareholding of the company is not diluted until conversion occurs. The investor has the opportunity for capital gain in the shares to offset the lower interest return received.

An increasing number of such instruments are becoming available. Capital notes and convertible notes are two of the more common types.

The structuring of hybrids reflects both the current and future economic outlook in terms of interest rates and growth potential. The structure is typically organised to be attractive to a certain type of investor and often is especially suited to their tax situation.

Warrants

Warrants are often combined with a long-term bond issue or equity issue to make the purchase of the bonds or shares more attractive to investors. They provide the warrant's owner with the right to buy a stated number of shares at a predetermined price within a specified period of time. They are frequently listed separately on an exchange and traded the same way as options on shares.

Initial public offering (IPO)

The term IPO is used to describe an issuer's first public offering of a security, although the term tends to be limited to the first issue of ordinary shares. There are a number of advantages of an IPO, including:

- permits diversification of the shareholder base and attract a larger number of investors,

- increases liquidity in the company's shares since investors can now sell their shares in the public market,

- creates a new funds source,

- establishes a market value for the company,

- possibly enhances the company's reputation and credibility, and

- creates a currency for future acquisition.

Disadvantages of IPOs include:

- additional cost of corporate reporting, for example listed companies incur additional costs to comply with more frequent stock exchange reporting requirements;

- greater disclosure requirements as full compliance with International Financial Reporting Standards (IFRS) will normally be required;

- lesser management flexibility, for example, changes in accounting policies will be subject to investor and analyst scrutiny to ensure there is a sound business justification for such changes;

- loss of control of the company by existing owners; and

- additional credit rating costs for rating agencies such as Moody's and Standard and Poor's to provide an assessment of the creditworthiness of a company's debt.

Venture capital and private equity

Not all businesses wish to go down the path of listing on a stock exchange. Several common reasons why companies may be looking elsewhere for external financing to fund expansion include:

- the reporting requirements imposed on public companies are often considered too onerous,

- a diversified shareholder base can impose restrictions on seeking fast and effective shareholder approval for strategic decisions, and

- the costs of floating and then maintaining a listing on a stock exchange can be substantial.

An alternative capital raising mechanism that has increased in popularity in recent years is the venture capital funding and private equity funds.

A key difference between venture capital and private equity funds is that venture capital funds tend to invest in newer firms and/or technologies, whereas private equity funds are typically seeking out relatively mature companies with strong cash flows.

An advantage of private equity and in particular venture capitalists is that they often provide more than just financing. Some other benefits include: business mentoring, industry and supply chain business contacts, and providing a large knowledge base on exit strategies for the business. To compensate for the long-term commitment, lack of security and liquidity, venture capitalists expect to receive very high returns on their investment.

Intermediated finance sources

Financial intermediaries are firms that pool the savings or investments of many people and lend or invest the money to other companies or people to earn a return.

Financial intermediaries include banks, investment companies, insurance companies, and pension funds.

- Banks lend the money of depositors to businesses and others, and pay depositors interest or provide them with valuable services, such as checking and electronic funds transfers.

- Investment companies allow small retail investors to pool their money together to reduce the diversifiable risks of investments and to profit from the expertise of professional money managers.

- Insurance companies pool the premiums of the insured to pay for the losses of a few of the insured, thereby preventing a financial catastrophe for the sufferers.

- Pension funds pool the contributions of workers to invest for greater returns, so that a pension income can be provided to the workers after they retire.

The assets and liabilities of financial intermediaries are primarily financial instruments. Loans, shares, bonds, and other investments are their assets while the deposits and payment obligations, such as the insurance company's obligation to pay for a loss or the pension fund's obligation to pay retirees an income, are their liabilities.

Financial intermediaries make a profit from the difference between what they earn on their assets and what they pay in liabilities.

So why don't individuals lend their money directly and earn all of the interest instead of getting only a portion? Or why doesn't a business simply sell shares or bonds directly to the public to save on the investment banking fee or on interest rates that would probably be less than what a bank would charge?

One reason is because financial intermediaries provide valuable services that cannot be obtained by direct lending or investing. Banks, for example, offer depositors safety for their funds. They have vaults for the safekeeping of cash and other valuables and deposits are insured by the government. Banks also provide payment services that make it simple to pay bills and keep records of those payments. Insurance companies provide financial protection in case of a loss, even if that loss is much greater than the premiums paid by the insured.

Another major reason for using financial intermediaries is because they reduce the risk of information asymmetry, where the receiver of the funds knows more about their financial condition and their intentions than does the giver of those funds. Financial intermediaries have expertise in assessing the risk of the applicant for funds that reduces adverse selection and moral hazard. They have easy access to various databases that provide information on both individuals and businesses, and they have expertise in doing their own research and monitoring.

Activity 7.3

Activity

For your particular country produce a list of financial intermediaries, for example, names of prominent banks, investment companies, insurance companies and pension funds.

Obtain the annual report of a bank or other financial institution. Review the statement of financial position and the accompanying notes and identify the similarities and differences to a chosen manufacturing or service related company's statement of financial position.

For the manufacturing or service related company chosen in 2, above, establish the following:

    a.   The type of accounts that are included in working capital.

    b.   Calculate the operating cycle (OC) and cash conversion cycle (CCC) and give your opinion on whether you consider these to be good or bad.

    c.   The relative mix of debt and equity, and has this changed substantially from the previous year.

Activity 7.4

Activity

1.   Why is short-term financial management one of the most important and time-consuming activities for a manager?

2.   What is the difference between the firm's operating cycle and its cash conversion cycle?

3.   Why is it important for a firm to minimise the length of its cash conversion cycle?

4.   What are the likely viewpoints of the finance manager, marketing manager, manufacturing manager and purchasing manager about the levels of the various types of inventory?

5.   What risks do ordinary shareholders take that other suppliers of long-term capital do not?

6.   Fishing Products Limited is analysing the performance of its cash management. On average, the firm holds inventory 65 days, pays its suppliers in 35 days, and collects its receivables in 15 days. The firm has a current annual outlay of $1,960,000 on operating cycle investments. The company currently pays 10 per cent for its negotiated financing. (Assume a 360-day year.)

    a.   Calculate the firm's cash conversion cycle.

    b.   Calculate the firm's operating cycle.

    c.   Calculate the daily expenditure and the firm's annual savings if the operating cycle is reduced by 15 days.

7. Cooper Limited uses 800 units of a product per year on a continuous basis. The product has carrying costs of $50 per unit per year and order costs of $300 per order. It takes 30 days to receive a shipment after an order is placed and the firm requires a safety stock of five days usage in inventory.

   a. Calculate the economic order quantity (EOQ).

8. Shapes Farm uses 12,600 baskets a year for apple shipment. Determine the optimum order quantity of baskets assuming the order costs per order is $600 and it costs $2 to carry a unit of basket in inventory per period.

Unit summary

Summary

In this unit you learned:

- an explanation of working capital,
- the sources and cost of working capital,
- managing cash as an extremely important function of management
- the fact there are numerous ways of raising equity, and
- the role of intermediate financial institutions.

Activity feedback

Activity 7.1

1. What is the cost of capital? What role does it play in making long-term investment decisions?

    The cost of capital is the rate of return a firm must earn on its investment in order to maintain the market value of its stock. The cost of capital provides a benchmark against which the potential rate of return on an investment is compared.

2. Why is the cost of capital measured on an after-tax basis? Why is the use of a weighted average cost rather than the cost of specific funds recommended?

    The cost of capital is measured on an after-tax basis in order to be consistent with the capital budgeting framework. The only component of the cost of capital that actually requires a tax adjustment is the cost of debt, since interest on debt is treated as a tax-deductible expenditure. Measuring the cost of debt on an after-tax basis reduces the cost.

    The use of the weighted average cost of capital is recommended over the cost of the source of funds to be used for the project. The interrelatedness of financing decisions assuming the presence of a target capital structure is reflected in the weighted average cost of capital.

3. How is the before-tax cost of debt converted into the after-tax cost?

    The before-tax cost is converted to an after-tax debt cost (k_i) by using the following equation: $k_i = k_d \times (1 - t)$ where t is the firm's tax rate.

4. Calculate the after-tax cost of debt if the before-tax cost of debt for a firm is 11 percent and it has a 35 percent marginal tax rate.

    11% (1-0.35) = 7.15 per cent

5. A firm has issued 10 per cent preferred share, which sold for $100 per share par value. The cost of issuing and selling the stock was $2 per share. The firm's marginal tax rate is 40 per cent. Calculate the cost of the preferred share.

    $10 / ($100 - $2) = 10.2%

6. A firm has a beta of 1.2. The market return equals 14 per cent and the risk-free rate of return equals 6 per cent. Calculate the cost of common equity.

    6% + 1.2(14% - 6%) = 6% + 9.6% = 15.6%

7. A firm has common share with a market price of $25 per share and an expected dividend of $2 per share at the end of the coming year. The growth rate in dividends has been 5 per cent. Calculate the cost of the firm's common equity.

($2 / $25) + 5% = 8% + 5% = 13%

8. Calculate the cost of the firm's common equity.

   a. Dividend growth = ($2.14 – $2.00) / $2.00 = 7%

      So, the cost of equity = ($2.81 / $55) + 7% = 5.1% + 7% = 12.1%

9. Calculate the weighted average cost of capital.

   a. WACC = (6% x 0.4) + (11% x 0.1) + (15% x 0.5)

      = 2.4 + 1.1 + 7.5 = 11%

10.

   a. Calculate the weighted average cost of capital using book value weights.

Long-term debt	50%
Preferred stock	5
Common stock equity	45
	100%

   ka = (0.5)(5) + (0.05)(14) + (0.45)(20) = 2.5 + 0.7 + 9 = 12.2%

   b. Calculate the weighted average cost of capital using market value weights.

Long-term debt	34%
Preferred stock	6
Common stock equity	60
	100%

   ka = (0.34)(5) + (0.06)(14) + (0.60)(20) = 1.7 + 0.84 + 12 = 14.5%

Activity 7.2

1. What is capital investment (budgeting)? Do all capital expenditures involve non-current assets? Explain.

   Capital budgeting is the process used to evaluate and select long-term investments consistent with the goal of owner wealth maximisation. Capital expenditures are outlays made by the firm that are expected to produce benefits over the long term (a period greater than one year). Not all capital expenditures are made for fixed assets. An expenditure made for an advertising campaign may have long-term benefits.

2. What weaknesses are commonly associated with the use of the payback period to evaluate a proposed investment?

    The weaknesses of using the payback period are:

    - no explicit consideration of shareholders' wealth

    - failure to take fully into account the time factor of money

    - failure to consider returns beyond the payback period and, hence, overall profitability of projects.

3. What are the acceptance criteria for NPV? How do they relate to the firm's market value?

    Acceptance criterion for the net present value method is if NPV > 0, accept; if NPV < 0, reject. If the firm undertakes projects with a positive NPV, the market value of the firm should increase by the amount of the NPV.

4. Do the NPV and IRR always agree with respect to accept-reject decisions? With respect to ranking decisions? Explain.

    The NPV and IRR always provide consistent accept/reject decisions. These measures, however, may not agree with respect to ranking the projects. The NPV may conflict with the IRR due to different cash flow characteristics of the projects. The greater the difference between timing and magnitude of cash inflows, the more likely it is that rankings will conflict.

5. State the decision criteria applied when using the accounting rate of return, profitability index and discounted payback period methods to evaluate capital expenditure projects. What are the major limitations in using these methods to evaluate capital expenditure projects?

    The decision criterion applied, when using the accounting rate of return, is that a project is accepted if the accounting rate of return exceeds a predetermined reference rate of return. The decision criteria, when applying the profitability index, are that acceptable projects with a positive NPV will have a PI greater than 1.0, and projects with a negative NPV will have a PI of less than 1.0. The decision criterion, when applying the discounted payback period (DPP), is to compare it against an acceptable maximum period. Where the projects are mutually exclusive, the project with the shortest DPP is preferred. A major limitation of the accounting rate of return is that it fails to consider cash flows and the time value of money. By averaging the annual profits, future profits count as much as current profits. With mutually exclusive projects, the profitability index can provide an incorrect ranking. The DPP lacks the simplicity of the payback period, and for mutually exclusive projects it may provide inconsistent rankings.

6.

    a. Machine 1: $14,000 / $3,000 = 4 years, 8 months

        Machine 2: $21,000 / $4,000 = 5 years, 3 months

    b. Only Machine 1 has a payback faster than five years and is acceptable.

c. The firm will accept the first machine because the payback period of four years, eight months is less than the five-year maximum payback required by the firm.

d. Machine 2 has returns which last 20 years while Machine 1 has only seven years of returns. Payback cannot consider this difference; it ignores all cash inflows beyond the payback period.

7.

a. NPV = 1,000 (PVIFA15%,5) – 2,500

$$= 1,000 \ (3.352) - 2,500 = \$852$$

b. Since NPV > 0, the project should be accepted

8.

a.

Year	CF	PVIF 15%,t	PV
1	$25,000	0.870	$21,750
2	10,000	0.756	7,560
3	50,000	0.658	32,900
4	10,000	0.572	5,720
5	10,000	0.497	4,970
6	60,000	0.432	25,920
			$98,820

NPV = 98,820 – 100,000 = –$1,180 < 0

b. Since NPV < 0, the project should be rejected.

9.

Time	Cash Flow	PVIF(12%)	PV of CF
0	$(5,000,000)	1.0000	$(5,000,000)
1	$2,500,000	0.8929	$2,232,143
2	$2,300,000	0.7972	$1,833,546
3	$2,000,000	0.7118	$1,423,560
4	$(1,300,000)	0.6355	$(826,174)
		NPV	$(336,924)
		IRR	6.80%

No the firm should not accept the project.

Activity 7.3

Your responses will depend on the organisation you choose.

Activity 7.4

1. Why is short-term financial management one of the most important and time-consuming activities for a manager?

    Short-term financial management, the management of the firm's current assets and liabilities, is one of the manager's most important functions. Managing these accounts wisely results in a balance between profitability and risk that has a positive impact on the firm's value. Therefore, managing these current balance sheet accounts to achieve an appropriate balance between profitability and risk takes a large amount of a manager's time.

2. What is the difference between the firm's operating cycle and its cash conversion cycle?

    A firm's operating cycle is the period when a firm has its money tied up in inventory and accounts receivable until cash is collected from the sale of the finished product. It is calculated by adding the average age of inventory (AAI) to the average collection period (ACP). The cash conversion cycle (CCC) is the number of days in the firm's operating cycle (OC) minus the average payment period (APP) for inputs to production. The CCC takes into account the time at which payment is made for material; this spontaneous form of financing partially or fully offsets the need for negotiated financing while resources are tied up in the operating cycle.

3. Why is it important for a firm to minimise the length of its cash conversion cycle?

    The longer the cash conversion cycle the greater the amount of investment tied up in low-return assets. Any extension of the cycle can result in higher costs and lower profits.

4. What are the likely viewpoints of the finance manager, marketing manager, manufacturing manager and purchasing manager about the levels of the various types of inventory?

    Financial managers will tend to want to keep inventory levels low to reduce financing costs. Marketing managers will tend to want large finished goods inventories. Manufacturing managers will tend to want high raw materials and finished goods inventories. The purchasing manager may favour high raw materials inventories if quantity discounts are available for large purchases.

    Inventory is an investment because managers must purchase the raw materials and make expenditures for the production of the product such as paying labour costs. Until cash is received through the sale of

the finished goods the cash expended for creation of the inventory, in any of its forms, is an investment by the firm.

5. What risks do ordinary shareholders take that other suppliers of long-term capital do not?

Common shareholders are the true owners of the firm, since they invest in the firm only upon the expectation of future returns. They are not guaranteed any return, but merely get what is left over after all the other claims have been satisfied. Since the common shareholders receive only what is left over after all other claims are satisfied, they are placed in an uncertain or risky position with respect to returns on invested capital. As a result of this risky position, they expect to be compensated in terms of both dividends and capital gains of sufficient quantity to justify the risk they take.
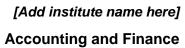
6.

    a. $CCC = 65 + 15 - 35 = 45$
    b. $OC = 65 + 15 = 80$
    c. Daily expenditure $= \$1,960,000/360 = \$5,444.44$
        Annual savings $= \$5,444.44 \times 15 \times 0.10 = \$8,167$

7. $EOQ = \sqrt{(2 \times 800 \times \$300)/50} = 98$ units

    a. $EOQ = \sqrt{(2 \times 12,600 \times \$600)/2} = 2,750$ units

Assignment 2

Semester x, 20xx

Assignment

Date issued:	xxxxxx 20xx
Due date and time:	xxxxxxxx 20xx at xxxpm
Delivery:	Post to xxxxxxxx, or bring to class on xxxxx 20xx.
Total marks:	100 marks
Weighting:	25% of final course grade
Instructions:	• Complete this cover sheet and attach it to your assignment. • Where applicable, show details of your workings. • This is an individual assignment and must be your own work. • Collusion, copying or plagiarism may result in disciplinary action • We advise that you keep a copy of this assignment.
Student Name:	
Student ID No:	

Lecturer:	xxxxx	Course ID: xxxx	Sem x, 20xx

Student declaration:	I confirm that: • This is an original assessment and is entirely my own work. • This assignment has not previously been submitted as assessed work for any academic course.
Student signature:	
ID No:	
Date of signature:	

Instructions

The purpose of this assignment is to provide you with experience in answering a number of questions based on the Management Accounting Modules in this course.

Instructions: Answer **ALL** questions.

Read each question carefully.

Answer only what is asked for.

Please type your responses or write clearly.

Summary of assignment:

Question	Type/Topic	Marks
1	Business Finance Environment	20
2	Time Value of Money	21
3	Capital Budgeting	30
4	Working Capital Management	10
5	Long-Term Financing	5
6	Risk and Return	14
TOTAL		100

Question 1

Business finance environment

(20 marks)

a. A telecommunication company has recently launched a new mobile phone network. The project was financed through a series of bank loans arranged by the company's finance manager. Identify two primary activities of the finance manager in this situation and briefly explain how those activities are related to the firm's balance sheet.

6 marks

b. Finance can be classified into two major areas of study: financial services and managerial finance. Briefly describe the differences between the two.

4 marks

c. Suppose you have been offered a job as a financial advisor for a group of risk-averse investors. How would you differentiate risk-averse investors from other types of investors? Briefly explain your answer. Would you recommend a project with a relatively large dispersion of expected returns to more risk-averse investors or to less risk-averse investors? Explain why.

5 marks

d. What is the principal-agent relationship in the context of a business organisation? Briefly explain how this relationship can lead to the agency problem.

5 marks

Question 2

Time value of money

(21 marks)

a. Mr. Mighty has $15,000 to deposit in King Bank today at 5.1% interest compounded annually.

    i.   Determine the balance of his savings account at the end of five years and at the end of ten years, respectively.

2 marks

    ii.   Use your findings in part (i) to calculate the amount of interest earned in the first five years and the next five years, respectively. Briefly explain why the amounts of interest earned in each succeeding five-year period are similar or different.

4 marks

b. You have just started a new job. Based on your salary, you plan to make a deposit of $17,000 at the end of each year in a savings account that pays a fixed interest rate of 8% compounded annually. Suppose you are able to buy a small apartment at the end of six years for a guaranteed price of $129,000. Determine whether you will have enough money to buy the apartment at the end of six-year period. Briefly explain your answer.

5 marks

c. You have just agreed to sell your car to your friend. You are given an option of either receiving a total of $75,000 today or being paid $13,000 at the end of each year for the next 8 years. If you can earn 9% interest rate compounded annually from your bank, which option should you take? Briefly explain your answer.

5 marks

d. BVO Manufacturing Company has the option of making an investment in a new machine that will cost $150,000 today. It is estimated that this investment will provide the net cash inflows to the company over the next four years as shown in the following table.

End of Year	Net Cash Inflows
1	$35,000
2	$50,000
3	$40,000
4	$60,000

Should the company make this investment if it requires a minimum annual rate of return of 11% compounded annually? Show your workings.

5 marks

Question 3

Capital budgeting techniques

(30 marks)

Alberta Limited is considering two mutually exclusive projects. The relevant cash flows for each project are shown in the table below.

	Project Ajax	Project Eden
Initial Investment	$55,000	$60,000
Year	Net Cash Inflows	
1	$22,000	$35,000
2	$22,000	$25,000
3	$22,000	$20,000
4	$22,000	$15,000

a. Define the terms "mutually exclusive projects" and "independent projects".

4 marks

b. Determine the payback period of each project. If the company has the maximum acceptable payback period of three years, which project(s) should the company invest in? Explain why.

7 marks

c. Suppose the company has a cost of capital of 12%. Determine the net present value (NPV) of each project. Which project is preferred in this situation and why?

7 marks

d. The finance manager at Alberta Limited is considering using the following equation to determine the risk-adjusted discount rate for each project.

$(RADR_j)$

$$RADR_j = R_F + [b_j \times (k_m - R_F)]$$

Where:

R_F = Risk-free rate of return

b_j = Beta for project j

k_m = Cost of capital.

Suppose the risk-free rate (R_F) observed in the market is 8% and the market rate of return (k_m) is 14%. The beta (b_j), which

is a measure of risk, for project Ajax is 0.75 and the beta for project Eden is 2.0. Determine the risk-adjusted net present value for each project. Which project is preferred in this situation and why?

8 marks

e. Compare your investment decision made in part (c) to that made in part (d). Briefly explain why they are similar or different.

4 marks

Question 4

Working capital management

(10 marks)

Serco Industries is concerned about managing cash in an efficient manner. The average age of inventories is 75 days and accounts receivable are collected in 45 days. Accounts payable are paid approximately 30 days after they arise. All calculations are based on a 365-day year. The firm spends $40 million on operating cycle investments each year, at a constant rate.

a. Determine the firm's operating cycle, cash conversion cycle and the amount of financing required to support the firm's cash conversion cycle.

6 marks

b. Explain why a financial manager must pay attention to the firm's cash conversion cycle. Discuss how the firm's financial manager might be able to efficiently manage the firm's cash conversion cycle.

4 marks

Question 5

Long-term financing

(5 marks)

Ordinary shareholders are suppliers of long-term capital for the firm. What risks do ordinary shareholders take that other suppliers of long-term capital do not?

Explain how those risks affect the cost of equity financing for the firm.

5 marks

Question 6

Risk and return

(14 marks)

Slender Limited must choose between two asset purchases. The annual rate of return and the related probabilities given in the following table summarise the firm's analysis so far on these alternatives

Project A			Project B	
Rate of Return	Probability		Rate of Return	Probability
-10%	0.01		10%	0.05
10%	0.04		15%	0.10
20%	0.05		20%	0.10
30%	0.10		25%	0.15
40%	0.15		30%	0.20
50%	0.30		35%	0.15
60%	0.15		40%	0.10
70%	0.10		45%	0.10
80%	0.05		50%	0.05
90%	0.04			
100%	0.01			

a. For each project, calculate:

    i.   The range of possible returns

    ii.   The expected value of return

    iii.   The standard deviation of the returns

6 marks

b. Construct a bar chart of each distribution of rates of return.

4 marks

c. Which project would you consider to be the least risky? Explain your answer.

4 marks