This course text is part of the learning content for this Edinburgh Business School course.
In addition to this printed course text, you should also have access to the course website in this subject, which will provide you with more learning content, the Profiler software and past examination questions and answers.

The content of this course text is updated from time to time, and all changes are reflected in the version of the text that appears on the accompanying website at http://coursewebsites.ebsglobal.net/.

Most updates are minor, and examination questions will avoid any new or significantly altered material for two years following publication of the relevant material on the website.

You can check the version of the course text via the version release number to be found on the front page of the text, and compare this to the version number of the latest PDF version of the text on the website.

If you are studying this course as part of a tutored programme, you should contact your Centre for further information on any changes.

Full terms and conditions that apply to students on any of the Edinburgh Business School courses are available on the website www.ebsglobal.net, and should have been notified to you either by Edinburgh Business School or by the centre or regional partner through whom you purchased your course. If this is not the case, please contact Edinburgh Business School at the address below:

Edinburgh Business School
Heriot-Watt University
Edinburgh
EH14 4AS
United Kingdom

Tel  + 44 (0) 131 451 3090
Fax  + 44 (0) 131 451 3002
Email  enquiries@ebs.hw.ac.uk
Website  www.ebsglobal.net

The courses are updated on a regular basis to take account of errors, omissions and recent developments. If you'd like to suggest a change to this course, please contact us: comments@ebs.hw.ac.uk.
Finance for the Oil and Gas Industry

**Ken Brown MA, MSc**
Ken Brown, MA Econ (Hons), MSc International Banking and Financial Studies, is a Finance lecturer in EBS, having previously worked as a Finance lecturer in the Department of Accountancy and Finance at Heriot-Watt University. His main area of interest is mergers and acquisitions and he has contributed to publications on acquisitions.

**Dr Peter Moles MA, MBA, PhD**
Peter Moles is on the faculty of the University of Edinburgh Business School. He took up this post following a career in the City in the international capital markets working for a number of banks, latterly for Chase Investment Bank. His responsibilities included the consultative selling of financial products, customer-related roles in product management, origination, trading, and corporate advisory. His last major post at Chase was as eurobond syndicate manager. His main research interests are in risk management, principally financial risk management, including foreign exchange management problems and the management of financial distress. He has an interest in how management decisions are made and the issues associated with managing complex problems. Training assignments have included KPMG programme, WM Company, NatWest Markets, the Advanced Management Programme in Scotland (AMPS), and Capital Markets training for PBG Bank, Lodz, Poland.

He is the principal author of the *Handbook of International Financial Terms* and has written two textbooks: *Financial Risk Management and Derivatives*. He also wrote the financial evaluation modules for the *Mergers and Acquisitions* course. He is currently engaged in editing an encyclopedia of financial engineering and risk management.

**Dr Kathryn Vagneur BSc, MSc, PhD, CPA**
Kathryn Vagneur manages a private investment portfolio in London. Previously, she was a director with Pricewaterhouse Cooper.

**Dr Craig Robinson BA (Hons), MBA, PhD, FHEA**
Craig Robinson is a former Teaching Fellow at EBS. Prior to joining academia, Craig spent some years working as a business manager for a Fortune 500 company at various locations across the UK, managing an average turnover of £2 million per year.

Craig’s research interests are focused on strategy-making processes. His PhD research involved examination of strategy processes and environmental scanning techniques in small, medium and large organisations. He is also interested in oil prices and management processes in the energy industry. He has presented conference research on oil prices and their relationship with management behaviour, and has run strategy development workshops for middle and senior management of large organisations in the oil and gas industry.
## Contents

**Module 1**  
**Introduction and the Tools of Finance**  
1/1

1.1 Introduction  
1/2
1.2 Defining the Industry  
1/2
1.3 An Overview of the Course  
1/7
1.4 Financial Decision Making in the Oil and Gas Industry  
1/8
1.5 The Financial System  
1/9
1.6 A Review of the Tools of Finance  
1/15
Learning Summary  
1/21

**Module 2**  
**Governance and Agency Issues**  
2/1

2.1 Introduction  
2/1
2.2 External and Internal Governance of Group Activities  
2/2
2.3 Trust: A Fundamental Requirement in Economic Relations  
2/3
2.4 The Domains of Corporate Governance  
2/3
2.5 Agency Issues in the Oil and Gas Industry  
2/9
Learning Summary  
2/12

**Module 3**  
**Interest Rates**  
3/1

3.1 Introduction  
3/1
3.2 Interest Rate Risk  
3/2
3.3 The Term Structure of Interest Rates  
3/11
3.4 Analysing Yield Curve Behaviour  
3/18
3.5 The Money Markets  
3/22
3.6 Term Instruments  
3/23
3.7 Types of Debt Security  
3/27
Learning Summary  
3/29

**Module 4**  
**Company Valuation**  
4/1

4.1 Introduction  
4/2
4.2 Why Firms Merge  
4/6
4.3 Valuation Methods  
4/17
4.4 Estimating the Opportunity Cost of Capital  
4/37
4.5 Estimating the Cash Flow  
4/47
4.6 Estimating the ‘Exit Price’ or Terminal Value  
4/49
Contents

4.7 Calculating the Net Present Value 4/50
4.8 Valuing Growth Opportunities 4/60
Learning Summary 4/78

Module 5 International Finance 5/1
5.1 Introduction 5/2
5.2 Foreign Exchange Rate Risk 5/3
5.3 Foreign Exchange Exposure 5/15
5.4 Differences between Foreign Investment and Domestic Investment 5/30
5.5 Financing Sources for the Multinational Oil Company 5/32
Learning Summary 5/33

Module 6 Equity and Commodity Risk 6/1
6.1 Equity Market Risk 6/1
6.2 Commodity Price Risk 6/11
Learning Summary 6/19

Module 7 Capital Structure 7/1
7.1 Introduction 7/2
7.2 Capital Structure 7/5
7.3 Capital Structure and Financial Distress 7/16
7.4 Project Finance 7/24
7.5 Agency Costs in Financial Distress 7/28
7.6 Causes and Costs of Financial Distress 7/34
7.7 Routes out of Financial Distress 7/45
Learning Summary 7/46

Module 8 Derivatives: An Introduction 8/1
8.1 Introduction 8/3
8.2 Arbitrage Relationships 8/11
8.3 Derivatives Markets 8/21
8.4 Uses of Derivatives 8/23
8.5 The Derivatives Building Blocks 8/28
Learning Summary 8/38
# Contents

<table>
<thead>
<tr>
<th>Module 9</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1</td>
<td>Introduction</td>
</tr>
<tr>
<td>9.2</td>
<td>Types of Option</td>
</tr>
<tr>
<td>9.3</td>
<td>Option Pricing Boundary Conditions</td>
</tr>
<tr>
<td>9.4</td>
<td>Risk Modification with Options</td>
</tr>
<tr>
<td>9.5</td>
<td>The Black–Scholes–Merton Option Pricing Model</td>
</tr>
<tr>
<td>9.6</td>
<td>Hedging and Derivatives</td>
</tr>
<tr>
<td></td>
<td>Learning Summary</td>
</tr>
</tbody>
</table>

| Appendix 1 | Practice Final Examinations |
| Appendix 2 | Financial Tables |
| Appendix 3 | Examination Formula Sheet |
| Index      | I/1 |
Module 1

Introduction and the Tools of Finance

Contents
1.1 Introduction ........................................................................................................ 1/2
1.2 Defining the Industry ...................................................................................... 1/2
1.3 An Overview of the Course .......................................................................... 1/7
1.4 Financial Decision Making in the Oil and Gas Industry ......................... 1/8
1.5 The Financial System ..................................................................................... 1/9
1.6 A Review of the Tools of Finance ............................................................... 1/15
Learning Summary ................................................................................................. 1/21

Craig Robinson

Learning Objectives
This module introduces the course and provides an overview of its content. Managers in the oil and gas industry require a good working knowledge of finance, which was introduced in the core Finance course and will be built upon over the next eight modules. This course is intended to enhance your portfolio of financial concepts and provide industry-specific examples.

When you have completed this module, you should be able to:

- describe the oil and gas industry as defined for the purposes of this course;
- describe financial management in the oil and gas industry in terms of the three major decision-making areas that confront the financial manager, namely:
  - the investment decision
  - the financing decision
  - the dividend decision
- describe the purpose and make-up of the financial markets and how oil companies use them;
- describe the financial instruments that oil companies can use on the capital markets;
- understand the underlying principles of finance;
- understand how and when to use the tools of financial arithmetic; and
- understand how these concepts and tools are applied in making financial decisions.
1.1 Introduction

In the summer of 2014 the oil price was comfortably above $100 per barrel where it had largely been since the start of the decade. Large oil companies like ExxonMobil, Chevron and Royal Dutch Shell were spending in excess of $30 billion per annum exploring for new oil and gas finds.

By the end of January 2016 the oil price had dropped to as low as $27 per barrel and the large oil companies were laying off workers and delaying projects. It is estimated that over $400 billion worth of projects were put on hold until the oil price recovered.

How do oil companies plan in an environment like this? Since the early 1970s there have been a series of large peaks and troughs in the oil price. In 1973 the oil price quadrupled from $3 to $12 per barrel and there were subsequent peaks in the oil price in 1980 (following the Iranian Revolution), in 1990 (spiking at $40) and in 2008 (when the oil price reached $147 per barrel). In the first part of the 2010s the oil price plateaued at between $100 and $110.

Deep troughs have accompanied these peaks. In 1985 the oil price fell below $10 per barrel and in December 1998 it dropped to $10.72 as a result of the economic slowdown caused by the Asian financial crisis. In March 2009, following the $147 peak in July 2008, the oil price was $35 per barrel – a fall of $112 within eight months. But before long the oil price was back over $70.

With such gyrations in the price how do managers and investors decide how to invest in the industry? The oil industry certainly isn’t dull.

Financial issues are at the heart of these events, and it is useful for a manager within the oil and gas industry to have an understanding of how and why they occurred. This is what will be covered in the Finance for the Oil and Gas Industry course. Each module takes concepts covered in the core Finance course and brings in new theories that are essential to a better understanding of finance. This is enhanced by using industry-specific examples to put financial theory in the context of the oil and gas industry.

In this module we will examine the oil and gas industry in general and then look briefly at the material contained within each subsequent module. We will also examine the three major decision areas in finance in the context of the oil and gas industry and look at the financial system in general. This will be followed by a brief review of the basic tools of finance.

1.2 Defining the Industry

In order to present a course on the oil and gas industry, we must first define it. Companies operating in the industry are heterogeneous, ranging from large integrated companies, such as ExxonMobil and Royal Dutch Shell, to smaller exploration and production companies, such as Cairn Energy, and to the large number of shale gas companies that have emerged in the US since the mid-2000s. Each faces some financial considerations that are found throughout the industry and some that are specific to the area of the industry in which it operates. For example, Shell, with
operations across the globe, has to deal with international finance on a daily basis. Cairn Energy also has to deal with international finance but on a different scale, because its operations are focused in specific geographical areas and parts of the supply chain. Centrica is a large integrated company like Exxon but produces and sells only gas. This entails a different set of financial considerations, yet the company operates in the same industry as Exxon, Shell and Cairn.

By examining the oil and gas industry supply chain, we can build a picture of the industry as a whole and better identify the differences between companies such as those mentioned above. The following description may not be completely accurate from an engineering point of view, but it is possible to separate the industry into its component business activities, as depicted in Figure 1.1. Some of the companies within the industry operate the length and breadth of the chain, while others choose to operate in only one or two of the stages.

![Figure 1.1 - The oil and gas industry supply chain](image-url)
1.2.1 The Upstream Sector

The oil and gas industry can be broken into two distinct sectors: the upstream and the downstream. Some oil and gas companies also refer to the ‘midstream’ sector, involving transport and storage, but for our purposes this is not a meaningful distinction. Below is a brief discussion of each stage of the upstream supply chain in terms of financial management.

- **Exploration** is, by its nature, a speculative activity that involves a high degree of investment risk. Companies supplying exploration services to the industry face a high degree of commodity price risk, and cyclical downturns in the price of oil and gas have a severe effect on both the level of activity and the level of research and development in this stage.

- **Development** of a new oil or gas field requires a great deal of upfront investment and is characterised by high commodity price risk. If a company developing a new field conducts an investment appraisal with an oil price assumption of $60 per barrel but the price falls to $40 per barrel and remains at that level over the life of the project, the investment may no longer have a positive net present value (NPV). Does the company hedge against this? Does it lock in to sell its oil at a particular price, or does it leave itself open to changes in the price? Sensitivity analysis and the correct investment appraisal techniques are important at this stage. Real options, which are touched upon in the core Finance course, are also a useful tool for valuing options open to the company and will be examined in more depth in this course.

- **Unconventionals** is included as a catch-all term for more complex sources of hydrocarbons such as tar sands and the shale reserves found in the US. The diversity of this stage of the supply chain means that a sound understanding of financial principles is essential for any manager operating within it.

- **Production** involves getting the oil or gas out of the ground. Real options become very important at this stage: should the company invest in secondary recovery technology and continue to produce from a declining well, or should it abandon the project? How valuable is the option to abandon the well? These are important questions that can be answered with financial tools. At this point the supply chain splits into oil and natural gas.

- **Crude oil trading** involves trading crude oil on the world’s commodity exchanges. It is here that the product is converted into cash. A working knowledge of the derivatives product set is essential to understand what happens at this point in the chain.

- **Gas processing** needs to take place before the gas can be traded as a commodity. Financial considerations here include investment appraisal and real options. This activity is included as part of the upstream sector because it is a necessary prerequisite to gas being traded.

- **Gas trading** operates on the world’s commodity exchanges; the financial considerations are similar to those involved in crude oil trading.

The upstream sector is inherently more risky than the downstream sector and is subject to a higher degree of commodity price risk. Why is this? It is here that the
raw materials are produced, and it is this part of the industry supply chain that relies on the revenue from the trading activity to operate. Another factor that will impact on financial decision making in the oil and gas industry (but is not explicitly a financial consideration) is that upstream activities often occur a long way from the company’s headquarters and in politically unstable areas. This introduces a further degree of risk and makes effective risk management an important financial activity within any oil and gas company. The degree of risk in the upstream sector will also have an impact on financing and dividend decisions.

1.2.2 The Downstream Sector

The downstream sector is separate from the upstream, and financial considerations in this part of the chain are different from those at the top. While activities for gas and oil are similar until they are extracted, the downstream sector can be split into two distinct chains: downstream oil and downstream gas.

1.2.2.1 Downstream Oil

These activities take crude oil from the upstream sector and convert it into marketable products that are then sold through different channels to industrial, business and retail customers.

- **Transport** involves various methods of operation. Oil can be transported by ship or pipeline, and financial considerations differ depending on the type of transportation used. For transportation by tanker the most immediate risk is to reputation: oil spills have an extremely damaging effect on the local environment. There are also investment appraisal considerations at this level because the building of a 32,000-dwt vessel represents a large and long-term investment. Commodity price risk is high in the tanker market because shipping rates are seasonal and cyclical with the price of crude oil. Pipeline operators face a similar financial environment.

- **Refining** is mass production characterised by complex engineering processes. The price of refinery output is influenced by the price of refinery input (crude oil). Looking at BP’s historical refining margins reveals that margins were higher in the third quarter of 2007, when the price of oil was $45 per barrel, than in the third quarter of 2008, when the price averaged $108 per barrel and hit an all-time high of $147. Refining margins are also seasonal but are less subject to swings in the price of oil. Refining petroleum products produces reasonably steady returns, quite unlike the upstream sector. This means that investment appraisal is not as complex and commodity price risk is less of a concern. However, for a company that engages in this activity only, derivatives and hedging of the oil price can be a big issue.

High refining margins helped buttress the earnings of the large integrated oil companies during the early part of the 2014–2017 oil price downturn. The refining part of the industry tends to fare less well when oil prices are rising because margins tend to erode in that environment.

- **Storage** requires companies to consider the cost of holding supplies. This is not a value-generating activity, but financial considerations such as the lease-versus-
buy decision on a fleet of tanker trucks and on storage facilities are involved. Good management of working capital is also paramount.

- **Marketing and distribution** involves selling the refined petroleum products to the end consumer. Financial decisions to be made here include investment appraisal, lease-versus-buy decisions on sites, and real options for expansion into new areas. Customers at this end of the chain are diverse, and this is explored more in the Edinburgh Business School course *Strategic Planning for the Oil and Gas Industry*.

- **Petrochemicals** businesses face similar decisions to those described for the refining and marketing stages of the supply chain.

The downstream oil sector is less risky than the upstream oil sector, and different financial considerations apply. Financing and dividend policy will also involve different considerations. The same can be said of the downstream gas sector, which we now examine.

### 1.2.2.2 Downstream Gas

Owing to the nature of the product (gas versus liquid), the downstream gas sector involves different activities from the downstream oil sector. The fact that the gas has to move through pipelines to the end consumer means that a company that merely sells gas to consumers has little scope for high financial returns.

- **Gas marketing** involves companies selling gas to retail, business and industrial end consumers. These companies purchase gas on commodities exchanges and then sell it on. They often purchase products months ahead through forward contracts, so a good knowledge of the derivatives product set is useful for a financial manager here. Companies are subject to considerable commodity price risk.

- **Transmission and storage** is done via large cross-country pipelines that operate under very high pressure. These pipelines serve gas-fired power stations and distribution networks that take the gas to business and retail customers. Financial considerations include using the correct investment appraisal techniques and real options for abandonment and expansion. In the UK the transmission pipeline network is owned by National Grid.

- **Distribution** involves smaller networks that take gas to homes and businesses, and financial considerations here are likely to be similar to those at the transmission and storage stage.

- **Liquefied natural gas (LNG)** technology means that gas can now be turned to liquid and transported across the world. This makes previously unviable remote fields more accessible. Issues such as NPV, real options appraisal and the lease-versus-buy decision are essential here.

There has been a very large amount of investment in the LNG sector since the mid-2000s. Chevron and its partners spent over $56 billion to bring the Gorgon LNG facility in Western Australia on stream in 2016. This was a project that was started in 2009 when oil and gas prices were a lot higher. Even with the fall in oil and gas prices it is expected that there will be significant investment in this sector from 2017 onwards.
Companies in this part of the industry can generally rely on stable returns and a locked-in customer base. This impacts financing and dividend policy as well as the other areas listed above.

1.3 An Overview of the Course

The next task is to provide an overview of the topics to be covered through the rest of the course. Each module builds upon concepts in the core Finance course and provides new financial tools for the manager in the oil and gas industry. In addition, examples from the industry are provided to put the theory in context.

Module 2 covers corporate governance issues and agency problems. Agency problems were covered briefly in core Finance and are discussed in more detail here. ‘Corporate governance’ refers to the set of mechanisms that oversee and regulate human behaviour within organisations and in subgroups within organisations and will be explored in more depth. Misaligned interests within oil and gas companies have caused problems in the past and are likely to do so in the future. The Shell reserves reporting scandal of 2004 is just one example of how better governance structures could have averted a large-scale financial disaster.

Module 3 looks at interest rates and debt in more detail, and aims to provide the reader with a better understanding of the factors that influence the level of interest rates and of the effect that changes in these rates can have on the value of financial assets. Theories of interest rate determination will be introduced and the operating implications for oil and gas companies considered. The different types of debt securities that an oil and gas company can issue will be discussed. Managers in the oil and gas industry need to understand interest rates to be aware of outside influences that can affect the financial performance of their company.

Module 4 is concerned with company valuation techniques. The concepts are new, but some of the techniques used will be familiar. They build on the capital budgeting material (Modules 3–6) of the core Finance text. This module assumes that you have a good understanding of this material. It is necessary for managers in the oil and gas industry to understand the different methods of company valuation, and their respective advantages and disadvantages, in order to better approach acquisitions and mergers. The oil and gas industry is often characterised by large companies acquiring small companies that have developed some valuable asset or knowledge. With knowledge of the methods of company valuation, managers can make better decisions in this important field. Real options are introduced in this module and options theory is expanded on later in the course.

Module 5 deals with international finance, and places a particular emphasis on currency risk. Oil and gas companies operate in diverse geographical areas and deal with a diverse range of contractors and subcontractors. This is complicated by the number of currencies involved. Should the company hedge its currency exposure? What influences fluctuations in exchange rates? Managers in the oil and gas industry will be able to answer these questions and more after working through this module.

Module 6 addresses equity and commodity price risk in detail. The sources and types of risk relating to equity will be explored. The difference between equity as an
asset and commodity assets that are consumable will be explored, along with some general determinants of commodity prices.

Module 7 covers capital structure in more detail. Some concepts from the core *Finance* text will be reviewed, and the area of financial distress will be explored in more depth. Agency conflicts will be discussed in terms of the oil and gas industry, and management of financial distress will be addressed. A good knowledge and understanding of this area is particularly important to the oil and gas industry manager because the global financial crisis of 2008–9 and the concurrent drastic fall in the price of oil left many smaller oil and gas companies unable to meet their interest payments. Oilexco North Sea, a wholly owned subsidiary of Canadian exploration company Oilexco, went into administration in January 2009 when it was unable to secure funding for its operations.

Between 2015 and 2016, 114 North American exploration and production companies sought Chapter 11 bankruptcy protection according to Haynes and Boone, a US law firm. These firms were struggling when the er oil price crashed down to $27 per barrel at the start of 2016. The Chapter 11 bankruptcy process allows companies to restructure, while being protected from creditors. Many of these firms were able to restructure and re-emerge on to the stock market, swapping a large part of their debt burden for new equity. The old shareholders usually ended up with nothing and the management team that led the company into bankruptcy would often manage it through bankruptcy and be incentivised to bring it back on to the stock market. All during this process, production would be maintained.

Module 8 and Module 9 look at derivatives in more depth. Derivatives were first addressed in the final module of the core *Finance* course, and the theory behind them is expanded on here. Many students have difficulty understanding the types of derivative in the product set and their various uses, and this is the focus of these two modules. Module 8 provides an introduction to forwards, futures, swaps and options and their uses. Module 9 is concerned with options and deals with the Black–Scholes–Merton option pricing formula, which is needed for real options appraisal. A good understanding of risk management tools and their uses is essential for the oil and gas industry manager who wishes to manage the risks highlighted in the earlier modules. This is illustrated with a worked example of a company hedging operation.

### 1.4 Financial Decision Making in the Oil and Gas Industry

There are three main areas of decision making within finance, and every firm, no matter its shape or size, faces these decisions. These were presented in the core *Finance* course and will be discussed briefly here in terms of the oil and gas industry.

- **The investment decision** refers to the assessment of how much cash to invest and what to invest it in. This is a difficult decision for oil and gas companies because investments are typically capital intensive and take a number of years to start generating cash. As highlighted in Section 1.2, the investment decision is a particularly difficult one in the upstream sector, where cash flows are subject to considerable risk. Therefore, a good understanding of sensitivity analysis, sound
capital rationing and use of the correct investment appraisal technique are all imperative for the manager in the oil and gas industry.

- **The financing decision** involves deciding where to source cash for investment. Companies have three choices: they can use retained earnings, borrow on capital markets or sell equity. Numerous factors affect this choice, but oil and gas industry managers need to be fully conversant in capital structure theory and the advantages and disadvantages of each type of financing. Most of the very large oil and gas companies, such as Exxon, Shell and BP, have a low level of debt in their balance sheets. Why have they made this decision, when they could easily raise debt at a favourable rate even when credit conditions are poor? Oil and gas managers who understand capital structure theory in relation to the industry can answer these questions.

- **The payout decision** is concerned with how to return cash to shareholders and how much to return to them. This is linked to both the investment decision and the financing decision, because an oil and gas company that decides to invest all its free cash flow and borrow to fund a large project will have little left to return to shareholders. The shareholders, however, may prefer this and be content with large capital gains as a result of the investment. The salient point here is that oil and gas industry managers must be aware of the options available to them in payout policy and of how these decisions affect shareholder wealth.

During the 2014–2016 oil price crash, the cash flows of the oil and gas companies have been put under extreme strain as they struggled to both invest in new projects and pay the dividends that shareholders expect, while their operating cash flows had collapsed.

Debt in these companies, as measured by capital gearing (net debt divided by debt plus equity), rose from levels of 10 per cent to 20 per cent – sometimes to even 30 per cent – in the first part of the 2010s. Many of the large oil companies were effectively borrowing to pay dividends. Interest rates were very low so this was affordable at the time. Cash flows were also being topped up by selling off minority stakes in oil fields and non-core assets.

These decisions have to be made by all companies in the oil and gas industry, no matter which part of the chain they operate in. A good working knowledge of the financial concepts involved in the decision-making process is therefore essential for managers within oil and gas companies.

### 1.5 The Financial System

The financial system is made up of the financial markets, the investing financial institutions, the investment banks and commercial banks, the other financial intermediaries, the companies and individuals that use the system to borrow and lend, the government, and the financial exchanges (the stock exchanges and derivatives exchanges). However, the financial system does not always function through these financial exchanges: most transactions in the foreign exchange market are ‘off-exchange’, or ‘over the counter’.
The financial system in operation today is global in nature. This is the culmination of a process that has been taking place over the past 30 years. The UK financial markets deregulated in 1986, and this facilitated the growth of London as one of the two global financial hubs, along with New York. About 50 per cent of all forex transactions are traded out of London, and the global nature of the financial system means that the markets are now closely interlinked. The forex market is the largest financial market with around $5.3 trillion traded every day. The US dollar makes up 85 per cent of this market. According to the Bank of International Settlements, the global derivatives market, which includes oil and gas futures, had $483 trillion worth of notional contracts outstanding at the end of 2016.

The global financial system currently operating out of London and New York is able to provide funds to creditworthy companies wherever they are based. The valuation and prospects of a company are assessed by credit analysts and investment bankers, and with the help of lawyers and accountants they will draw up prospectuses that can quickly be put before prospective investors so the company can raise the necessary capital in a very short period of time. London and New York are currently uniquely placed to provide these services. Both financial centres have the expertise in all the relevant areas to raise large amounts of capital for large firms. If Exxon wished to issue a $30 billion bond, there are only two financial centres that would be able to achieve that: London and New York.

Saudi Aramco, the national oil company of Saudi Arabia, is planning an Initial Public Offering (IPO) for some time in 2018. It is expected that the firm could be valued between $1 and $2 trillion and that about $100 billion worth of shares will be sold. There are only two stock exchanges in the world that could handle an issue of that size: either London or New York. Both are fighting hard to win the mandate for the sale.

1.5.1 How Does the Financial System Work?

The financial system facilitates a flow of funds from savers to borrowers. It collects pools of cash from savers, and through the markets or through financial intermediaries the cash is made available to companies to borrow. Savers could be individuals building up a retirement fund: investors who need to find a place where their surplus funds will earn a reasonable, but safe, return. Companies need to raise finance to expand their businesses. They can sell financial securities directly to investors (a primary issue) in the form of bonds or stocks, or the investor can buy financial securities on the stock exchange (secondary market) through financial intermediaries.

Often the funds flowing through the financial system don’t go through the markets. Commercial banks traditionally raise most of their funds from a depositor base (during the build-up to the global financial crisis many of these banks turned to the interbank market for extra funds). Those funds are then made available to companies as loans (as opposed to bonds, which are market instruments). The banks are acting as intermediaries, passing the funds on to the end-user.

The banks themselves may raise further funds from the financial markets for lending purposes. The interbank market will lend funds to banks, but the borrowing
bank will have to repay this in the short term. As long as this market functions normally, the banks can roll over these interbank loans and keep raising finance for corporate borrowers. The interbank market operates as a kind of monitoring device on the participating banks: banks can see who is operating in the market, who is borrowing and lending and for how much, and what rates are being paid. There is a large degree of embedded trust in the market, and banks can raise funds at rates very close to the benchmark LIBOR (London Interbank Offered Rate). However, with the global financial crisis this trust broke down. Banks were fearful of being on the wrong side of a deal in which the other party would default, resulting in a loss exposure. Activity stopped and the borrowing spread over LIBOR ballooned out. Credit dried up. The banks were not lending to each other, which made it difficult for companies to borrow directly from the banks.

If companies need finance but this route of borrowing directly from banks is closed, the alternatives are borrowing from the bond market or raising equity finance (i.e. selling bonds or selling new shares).

1.5.2 What Are the Functions of the Financial System?

Banks are not the same the world over: banks in Europe will perform different functions from those performed by banks in the UK and US. However, over time, and especially since the turn of the millennium, financial institutions worldwide have become increasingly similar in what they do and how they make money. Yet it is more important to examine the functions of the financial system than the financial institutions themselves, because the financial functions are more stable than the financial institutions. The job of collecting savings and disbursing loans remains the same as it always has, but the institutions that do that job have changed over time as a result of the competitive nature of the markets. Innovation and competition have resulted in greater efficiency in the performance of the financial functions.

There are six core functions of the financial system.

1. **Resource transfer across time and space.** The financial system allows resources to be deployed over different time periods, over different areas of the world and across different industries. Buying a house and saving for retirement are examples of transferring resources across different time periods. Savings can be transferred from parts of the world with limited attractive investment opportunities to areas where there are good growth prospects. In the 1970s the petrodollars earned by the Gulf states were saved and deposited in the London financial markets. The funds were then recycled and lent out to areas that showed growth prospects, such as Latin America and the industrialising nations of East Asia. Much earlier, in the mid-nineteenth century, UK savings were channelled into building the US railroad infrastructure. This pattern has been repeated over the years and a recent case of recycling of savers’ funds was the investment by China in the US Treasuries market. China’s ownership of US government debt peaked at $1.3 trillion in 2013, when China was the largest external holder of US debt. This has since declined as China has sold the US debt to support its own currency. By the late 2010s Japan was the largest holder of US government debt.
The financial markets allow savers to benefit by investing in opportunities that offer higher returns. A scarce resource (cash) is made available to businesses that need it to expand, whether this is from a company in a high-income country or in a middle- or low-income country. High-income countries have larger and deeper pools of capital available for businesses, but businesses around the globe can access these markets. The financial system is efficient in channelling funds to new industries and industries that offer high returns. It is the conduit for transferring these funds, but it does not always mean that the transfers are optimal. The late 1990s saw a colossal amount of investment in the telecoms and internet industries, which sped up their development. However, with the internet boom there was overinvestment and much of the invested capital was destroyed. This rise in overinvestment was repeated with the shale gas boom in the US in the period from 2006 to 2014 when hundreds of billions of dollars were invested when the oil price was high. Following the oil price crash, much of the borrowing that was undertaken to fund the investment had to be restructured in Chapter 11 bankruptcy and billions of dollars of equity had been wiped out.

2. **Risk management.** The financial system is also efficient at transferring risk, which is done by specialist financial institutions such as insurance companies. Individuals or businesses can buy protection from downside risk in the form of insurance. The policy they buy is a put option (see Module 8 and Module 9): a premium is paid to the insurer and if the relevant negative event occurs the insurance company pays out. A put option is a derivative instrument that increases in value as the underlying asset falls in value. When the insurable event occurs, the value of the insured item falls and the insured party receives the value of the insurance cover.

Insurance companies bundle the risks together so that the cost of insurance is as low as possible. It would be too expensive to try to offer insurance outside the financial system. With these economies of scale, the insurers can offer an efficient means of offsetting risk. The insurance company is the party that takes the risk: it has to pay out if the insurable event occurs.

For example, what if an oil company decides not to insure its facilities on the basis that the premiums are too high and the claims it has made in the past have amounted to a fraction of the cost of insurance? The cost of being wrong is surely too high. The investors would have to deal with the uncertainty of not knowing when this might blow up on the company. The investors would demand a higher risk premium, and the cost of capital would rise for the company. With insurance, and the effective risk transfer it brings, investors are reassured.

When lenders lend to a business, they do not bear all the risk. Most companies have equity investors. The equity investors represent the transfer of some of the risk as far as the debtholders are concerned. If the company gets into financial distress, it is the shareholders who bear the risk first: they are the cushion for the debtholders. The debtholders may also lose some of their capital, so debtholders, along with the shareholders, share the business risk the company faces.

Lenders can also transfer risk in other ways. If an individual or business borrows from a bank and the bank asks for collateral, the bank is effectively transferring the risk of the loan back to the borrower.
3. **Payment clearing and settlement.** The financial system needs an efficient way for individuals and businesses to settle up their financial transactions. Oil companies operating overseas have to arrange large numbers of transactions to pay for raw materials and wages, to settle contracts and to pay governments. The financial system does this seamlessly.

For individuals travelling for business or pleasure the ability to take a small piece of plastic and be guaranteed accommodation, transport, food and most other goods and services is a huge source of comfort. That is one of the key functions of the financial system, which operates quietly in the background and is often taken for granted. Imagine a country in which this payment system is not accepted and there are currency controls and no convertibility of the local currency. The ability to do business there efficiently would break down.

The efficient functioning of the financial system is dependent on a smoothly operating clearing and settlement system. The adoption of the euro removed a lot of inefficiency from doing business in Europe. Italians trading with the French, for example, no longer have to change lira into francs or worry about the exchange rate.

4. **Pooling of resources and creating shares.** In the early days of the oil and gas industry it was possible for individuals and small businesses to run an oil business. As the industry and the world economy grew, the funds needed to set up oil companies or similar businesses grew beyond the means of individuals and families. The financial system provides a mechanism for businesses to access the funds necessary to grow. Individuals may no longer have the financial ability to fund these ventures, but they can pool together with others (in a stock market) and buy a share in a business.

Suppose you want to buy a house in Monte Carlo but don’t have the $6 million needed to purchase it. You have only $200,000 and are not permitted to buy just the thirtieth of the house that you can afford. The financial system would provide a way. By pooling with others you could raise the $6 million, giving you a thirtieth share in the house and the right to use it for a number of days per year.

In 2017 the price of a single class A share in Warren Buffett’s investment vehicle, Berkshire Hathaway, was more than $254,000. If you wanted to buy a single share, that’s how much money you needed. If you wanted to invest only $10,000 in Berkshire Hathaway, what could you do? Buffett has created another class of share – the B share – that is priced for the person on the street. In 2017 a B share could be bought for around $169. The B shares have lower voting rights than the A shares. Most companies will subdivide their shares so that investors can invest the amount they wish.

5. **Providing information.** Financial assets will be accurately priced if all the information about the asset is known and freely available. The quantity and quality of information provided by the financial markets have improved dramatically in the first two decades of this century. The improvement in the quantity of information available for all investors has been the result of the progress of the internet. Almost all investors now have access to comprehensive information on companies and financial assets. The quality of the information may not have
improved as much as the quantity, but it is now more accessible to more inves-
tors.

The prices the financial markets set for assets provide critical signals to managers
regarding the success of their strategy. Managers – if they know the intrinsic
value of their businesses – can take action to remedy undervaluation or overval-
uation by the market. If the market appears to be undervaluing the company’s
shares, the decision can be taken to repurchase shares. This sends a credible
signal to the financial markets that the shares were undervalued. This is new
information and the share price would be likely to rise on the action.

6. **Dealing with conflicts of interest.** An efficient financial system can ease the
incentive problems that exist in the markets. Some examples of these problems
are given below.

- **Executive remuneration.** How much should chief executives be paid and
  who is in control of that decision? This remuneration seems to go only one
  way, whereas shareholder returns are more volatile. There needs to be more
  alignment between executive reward and shareholder return.

- **Asymmetric information.** In the case of asymmetric information, one party
  has more information than the other and can take advantage of it. Adverse
  selection is a branch of this problem. For example, a seller of an asset has
  much more information about its worth than an outside buyer and so the ex-
  ternal buyer pays more for it than it is worth. Another example is a company
  that knows it is facing much higher risk than it discloses and attempts to buy
  insurance on that risk.

- **Perverse incentives.** These are incentives that have the opposite effect to
  that intended. An example from the world of finance is paying bankers pro-
  portionately to the size of the bank. The intention may be to increase the
  power and profitability of the bank, but, as the global financial crisis has
  shown, the drive for size exposes the bank to catastrophic risks.

- **Moral hazard.** For example, a party having some insurance cover takes ex-
  cessive risk or fewer precautions against the insured events. This is a problem
  if there is a conflict of interest between the contracting parties.

An efficient financial system eases the principal–agent problem and the prob-
lems of moral hazard and adverse selection so that the benefits of the financial
system – pooling of savings, transfer of resources, risk sharing and specialisation
– can be captured. By backing loans and bonds with collateral, debtholders re-
duce some of the incentive problems surrounding lending. With secured
borrowing lenders do not have to monitor borrowers so closely, thus reducing
agency costs. Insurance policies with high excesses (deductibles) remove some of
the moral hazard. Risky firms that prefer lower excesses will be identified by the
insurers and charged higher premiums to reflect this.

Aligning managerial compensation with shareholders’ interests is something of a
holy grail in finance. In the 1970s conglomerate companies in the US were iden-
tified as being hugely wasteful. Some of these were oil companies that had
diversified far from their core business. Investors have sought to remedy this
problem. However, since the early 1990s top manager remuneration has grown
far more rapidly than that of other employees and faster than shareholder re-
turns. Remuneration packages have failed to align the interests of shareholders and managers. The dot.com bubble and the global financial crisis exposed unbalanced reward systems in which managers seem to take all the upside and suffer very little downside. The latest thinking on managerial incentives is to tie in option and stock grants for the very long term, restricting executives in what stock sales they can make. If managers have more of a financial stake in the company (i.e. share ownership), they will gain and lose in the same manner as other shareholders. With executive options, they did not suffer on the downside.

1.6 A Review of the Tools of Finance

The last part of this introductory module is devoted to a review of the tools of finance introduced in the core Finance course. This is intended to provide a refresher in a number of basic areas that are integral to the more complex concepts presented later on in this course. You should have a solid grasp of these before moving on to the more advanced material.

1.6.1 Basic Concepts

- The time value of money. There is a set of basic mathematical tools that every manager should have a grasp of. Many revolve around the principle of the time value of money: the assumption that the value of money is dependent on the time at which it is received. Does a company prefer to receive £5000 today or in five years’ time? Clearly £5000 received in five years’ time does not have the same value as £5000 received today. To determine the value of the £5000 to be received in the future we need to discount it to its present value. The activity of discounting future cash flows to their present value appears time and again in finance and is the basis of many more complex financial models.

- Opportunity cost. Every course of action involves forsaking other courses of action, and the ‘opportunity cost’ of an action is the best alternative forgone. For example, an individual has £100 and the choice of investing in company A or company B. If they choose to invest in A, they give up the opportunity to invest in B: the investment in company B is the opportunity cost. Opportunity cost is an important concept for decision-making purposes and is recognised in finance through the discount rate. All money invested can be left in a bank at a certain rate of interest – this is its opportunity cost. If a particular investment offers a lower rate of return than this interest rate, then it is not worth undertaking.

- Cost of capital. The cost of capital is the return that a capital supplier expects from an investment. The capital supplier can be a shareholder or bondholder. Shareholders invest capital in return for ownership of a piece of the company, and they expect a return on this investment in the form of dividends. Bondholders invest capital in return for a specified annual payment, or coupon, over a number of years. In addition to this, bondholders receive their initial investment, or principal, when the investment matures. The cost of capital is used to discount cash received in the future to the present time.
• **Expected return and risk.** Capital suppliers expect to be adequately compensated for the risk they take, and risky investments must have high returns. The higher the risk of an investment, the higher the return.

• **Valuing financial securities.** Financial securities come in two main forms: stocks/shares and bonds. The rational valuation of a financial asset is the value of all its future cash flows discounted to the present. The cash flows from shares are the dividend payments, and the cash flows from bonds are the annual coupon and principal repayment on maturity. Cash flows for shares are discounted by the company's cost of capital, and cash flows for bonds are discounted by the set of spot rates on the market, known as the **term structure of interest rates.** This is discussed in more detail in Module 3.

These are basic concepts that underlie much of the financial theory and practice presented in this course. We will now review some of the mathematical tools of finance in more detail.

### 1.6.2 Present and Future Values

We have already stated that a sum of money received today is worth more than the same sum received in five years' time. This is because of inflation and the opportunity cost of interest forgone. The present value (PV) of a cash flow at some point in the future is given by the formula in Equation 1.1:

\[
P_V = \frac{FV(t)}{(1 + r)^t}
\]

where FV is the future value of the cash flow, \( t \) is the number of periods in the future, and \( r \) is the interest or discount rate. By raising the discount rate to the power of the number of periods, the calculation takes compounding into account. Present value can also be calculated using the appropriate discount factor from a statistical table. A present values table is provided in Table A2.1 in Appendix 2 of this course. The discount factor is used as follows:

\[
P_V = PVIF_{r,t} \times FV(t)
\]

where PVIF is the present value interest factor, or discount factor, from the table.

For example, which of the following two options would you choose, assuming a 5 per cent annual return on money at the bank?

- Receive £800 today.
- Receive £1000 three years in the future.

Using the formula in Equation 1.1, the present value of £1000 in three years is given by:

\[
P_V = \frac{\£1000}{(1.05)^3}
\]

\[
= \£863.84
\]
So the £1000 in three years’ time is worth approximately £864 at the present time. Clearly the £800 to be received today has a present value of £800, so it makes sense to choose to receive the money in three years’ time, because it has a higher present value.

Another way of looking at this is to ask: if I accept the £800 today, and put it in the bank at 5 per cent per year, what will it be worth in three years’ time? To calculate this we need to know the future value (FV) of the cash flow. The future value of a cash flow is given by the formula:

\[
FV = PV \times (1 + r)^n
\]

where \(PV\) is the present value of the cash flow, \(n\) is the number of periods in the future, and \(r\) is the interest rate. A future values table can be found in Table A2.3 in Appendix 2.

So what is the £800 received today worth in three years’ time? Using the formula in Equation 1.4 this is given by:

\[
FV = £800 \times (1.05)^3 = £926.10
\]

It is worth £926 three years in the future. From either perspective the second option is more attractive.

It is worth noting at this point the effect of different interest rates on present and future value calculations. A higher interest rate causes the present value of a future cash flow to be lower, and the future value of a present cash flow to be higher. The reverse is true of lower interest rates. Look at this example again. If the interest rate at the bank was 8 per cent, which option would you choose? This can be answered by calculating the present value of £1000 in three years’ time at a rate of 8 per cent and the future value of £800 at 8 per cent for three years.

Using the formulae in Equations 1.1 and 1.4 gives:

\[
PV = \frac{£1000}{(1.08)^3} = £793.83
\]

\[
FV = £800 \times (1.08)^3 = £1007.77
\]

The future value of the sum to be received today is £1007, and this time the first option is confirmed as being more attractive. It should be clear to the reader that the present and future values of cash flows are directly related to one another through the interest or discount rate. Simple calculations such as the example above can be tackled in either way – the result is the same. The effect of interest rates on the value of investments will be discussed in more detail in Module 3.
1.6.3 Annuities

An annuity yields a fixed sum each period for a given number of periods. Any set of cash flows identical each period and subject to the same interest or discount rate can be classified as an annuity. People with private pension funds often invest in an annuity when they retire, paying a fixed sum in return for an annual or monthly payment for a given number of years.

For example, if you were offered an investment for which you would be paid £400 every year for 10 years, how much would you be prepared to pay for it, if you can get 6 per cent in your bank account? Clearly not £4000, because this does not take into account the time value of money. There are two ways to calculate the present value of an annuity (PVA). We can discount each cash flow to its present value:

$$\text{PVA} = \frac{£400}{(1.06)^1} + \frac{£400}{(1.06)^2} + \cdots + \frac{£400}{(1.06)^{10}}$$

$$= £2944.04$$

This gives us a present value of £2944.

Alternatively, we can use the relevant statistical table to calculate the present value of this stream of cash flows. The annuity factor is used as follows:

$$\text{PVA} = \text{PVIFA}_{r \times t} \times \text{CF}$$

where PVIFA is the present value interest factor of an annuity, $r$ is the discount rate, $t$ is the number of periods, and CF is the per-period cash flow amount. This gives:

$$\text{PVA} = \text{PVIFA}_{0.06 \times 10} \times £400$$

To get the annuity factor, go to Table A2.2 and find the column for 6 per cent and the row for 10 periods. This gives an annuity factor of 7.3601, so the annuity calculation is:

$$\text{PVA} = 7.3601 \times £400$$

$$= £2944.04$$

So you would be prepared to pay £2944 for this set of cash flows. The annuity calculation saves time on long-winded present value calculations and is useful when the interest rate and cash flow amount are constant.

Annuity calculations can be used in a similar fashion to calculate the future value of an annuity (FVA). For example, if you decide to invest £1000 per year in a high-interest bank account at an annual rate of 9 per cent, how much will this be worth after 10 years? We can calculate the answer using a future value annuity table, like the one in Table A2.4. The calculation required is:
FVA = \( FVIFA_{0.09, 10} \times £1000 \) \hspace{1cm} (1.11)

Using the table, we can find the correct future value interest factor of the annuity, which is 15.193. This gives:

\[
FVA = 15.193 \times £1000 = £15,193
\] \hspace{1cm} (1.12)

So if you were to invest this amount over 10 years you would have £15,193 at the end of the period. The future value annuity calculation again avoids the long process of calculating interest and the new capital amount for each year.

### 1.6.4 Perpetuities

A perpetuity is a fixed cash payment each period that continues indefinitely. The perpetuity framework is used in finance for a number of purposes, including share valuation, terminal valuation of company cash flows and valuation of undated bonds. An individual may want to use the perpetuity calculation if they are planning on buying a flat to let out and want to calculate the maximum price they should pay.

A perpetuity is valued as follows:

\[
PV = \frac{CF}{r}
\] \hspace{1cm} (1.13)

The cash flow divided by the discount rate gives the present value of a perpetual set of cash flows. For example, if you are planning to buy a flat to let out and expect to get an annual after-tax income of £4000, and the interest rate you earn at the bank is 6 per cent, what is the maximum amount you should pay for the property?

\[
PV = \frac{£4000}{0.06} = £66,667
\] \hspace{1cm} (1.14)

The maximum amount you should pay for the flat is £66,667. If the current owner will not take less than this, you should walk away and find an alternative investment.

Another consideration with the perpetuity calculation is that a set of cash flows such as the ones presented above can grow over time. It is not realistic to assume, when you buy a flat to let out, that the rent will stay at £4000 per year indefinitely. Owing to the effects of inflation the annual rent is likely to grow. The formula for a growing perpetuity is as follows:

\[
PV = \frac{CF}{r-g}
\] \hspace{1cm} (1.15)
where \( g \) is the annual growth rate of the cash flow. Returning to the previous example, if you know that rent inflation in the area tends to run at 3 per cent per year, the revised valuation for the set of cash flows is:

\[
\text{PV} = \frac{\£4000}{0.06 - 0.03} = \£133,333
\]

(1.16)

Now that the growth of the cash flow has been taken into account, the present value of the investment is higher, and you would be prepared to pay more than previously calculated.

1.6.5 Compound vs. Simple Interest

Interest paid on capital comes in two forms: simple and compound. Simple interest does not take previous interest payments into account. The most common example of this is a corporate bond. If the coupon (interest) rate on a three-year bond is 6 per cent and the par value is £100, then £6 of interest will be paid each year, and previous interest payments will not be added to the capital amount. Compound interest is calculated on both initial capital investment and accrued interest from previous periods. For example, putting £1000 in a savings account at 5 per cent per year will result in £1050 at the end of the first period. The 5 per cent interest for the second period will be paid on the initial £1000 plus the £50 of accrued interest.

However, compound interest has many variations. Most of the discussions on the tools presented above have used a ‘per-period’ approach. But how long is that period? It is not important when presenting simple examples, but it is very important to the company that is borrowing to finance a new project, or to an individual taking out a mortgage on a new property. Some loans are offered at an annual rate of \( x \) per cent and are compounded more than once per year. If this is the case, it is necessary to calculate the annual percentage rate (APR). This can be done using the following formula:

\[
\text{APR} = \left(1 + \left(\frac{r}{m}\right)\right)^m - 1
\]

(1.17)

where \( r \) is the annual rate and \( m \) is the number of times the interest is compounded per year. For example, if you are offered a loan at a rate of 10 per cent per year, compounded monthly, what is the annual percentage rate?

\[
\text{APR} = \left(1 + \left(\frac{0.10}{12}\right)\right)^{12} - 1
\]

\[
= 0.1047
\]

(1.18)

So the APR of a loan at 10 per cent per year compounded monthly is 10.47 per cent. But what if the interest is compounded daily?
If the interest is compounded daily, the APR is 10.51 per cent. This may seem like a small difference, but for an oil and gas company that takes out a £100 million loan to finance a large expansion project the numbers are important. If interest is compounded monthly then annual interest payments are £10,470,000, while daily compounding results in an annual interest payment of £10,510,000: an annual difference of £40,000.

The larger the number of compounding periods, the higher the actual amount of interest paid. Some lending institutions compound interest continuously. This means that interest is added to the capital amount as soon as it is earned and there is no passage of time between compounding. In order to calculate the annual rate on a loan offered at 10 per cent per year compounded continuously, the following formula is needed:

$$\text{APR} = e^{r}$$  \hspace{1cm} (1.20)

Where $e$ is the root of the natural logarithm (2.718…) and $r$ is the rate on the loan. This means that a loan offered at 10 per cent per year compounded continuously is 10.52 per cent. This would cost the oil company in the example above a further £10,000 per year in interest payments. The type of compounding applied to a loan or an investment is crucial to its cost or future value.

**Learning Summary**

This module has introduced the oil and gas industry for the purposes of this course and has discussed some important features of the industry as it relates to the subject of finance. The three main decision-making areas have been reviewed and the financial system examined. Finally, a review of basic financial concepts has been presented. You should now be ready to move on with the main body of the course, which contains material not covered in the core Finance module.