

Chapter 5 Valuing Shares

Chapter Overview

The *What Companies Do* opening feature discusses the news announcement from Qantas in 2012 that it may have a loss for the first time since it was sold to investors by the Australian Government in 1995. The market for shares had to consider if this announcement would be likely to change the value of the company. The methods of Chapter 5 for valuing shares would be used by analysts and investors reviewing the market value of Qantas.

What Companies Do Discussion Questions:

1. What are the elements of Qantas' business that would be valued by fund manager shareholders?
2. What key valuation features in this example might one expect to be applicable more generally to valuing any business?

This chapter discusses:

- 5-1. The Essential Features of Preferred and Ordinary Shares
- 5-2. Valuing Preferred and Ordinary Shares
- 5-3. The Free Cash Flow Approach to Ordinary Share Valuation
- 5-4 Other Approaches to Ordinary Share Valuation
- 5-5 Primary and Secondary Markets for Equity Securities

Technology

1. **Smart Video** interviews Jay Goodgold, Managing Director of the Equities Division for Goldman Sachs, talking about road shows for IPOs.
2. **Smart Video** interviews Kent Womack, Dartmouth College, about potential conflicts of interests among analysts.
3. **Smart Video** interviews Kenneth French, Dartmouth College, about the impact of competition on valuation.
4. **Smart Video** interviews Robert Shiller, Yale University, concerning high P/E ratios, and in particular the impact of high P/E ratios.
5. **Smart Concepts** demonstrates a variable growth model.
6. **Smart Solutions** provides a step-by-step solution to Problems P5-7 and 5-14.

After studying this chapter you should be able to:

- describe the differences between preferred and ordinary shares
- calculate the estimated value of preferred and ordinary shares using zero, constant and variable growth models
- value an entire company using the free cash flow approach
- apply alternative approaches for pricing shares that do not rely on discounted cash flow analysis
- understand how investment bankers help companies issue equity securities in the primary market
- be aware of the Australian secondary securities exchange markets in which investors trade shares.

Lecture Guide

This is another key chapter, introducing share valuation models. Not only do individual investors want to know how to value these securities, but corporate managers need to know about valuation. A company may be in the market for debt or equity financing, and a manager who wants to maximise share price also needs to know the valuation models and factors that affect share price.

5-1 The Essential Features of Preferred and Ordinary Shares

Note that debt is *less* risky than equity. Debt holders have first claim on the company's assets in the event of insolvency. Debt holders have a legal contract with the company with a variety of provisions to protect the bondholders, for example, provisions concerning minimum amounts of debt the company can have or certain net worth or current ratios.

Although shareholders don't have the protections that bondholders have, they have the potential for a much larger return. They are the *residual claimants* of the company. Remind students of the equations for the balance sheet:

$$\text{Assets} - \text{Liabilities} = \text{Shareholders Equity.}$$

Ask students how this equation shows that shareholders are willing to take on more risk than bondholders. Point out that the liabilities are fixed – even if the company does well bondholders will not receive more than their contract calls for. So, if the company succeeds and its assets increase while liabilities remain the same, then shareholders' portion increases. Again, this points out the fundamental risk-return relationship in finance: investors who take on more risk expect higher returns.

While *preferred shares* sounds like an equity security, in reality it acts more like a debt security. Like a bond coupon interest payment, a preferred share dividend is also fixed, and if the company does well, preferred shareholders do not have a claim on that wealth. Typically, preferred shareholders, who normally have no say in corporate governance, will have a say if the company becomes financially distressed.

Nonconvertible preferred equity is primarily issued by two very different kinds of organisations, mature, stable, regulated infrastructure companies, and financially distressed companies. Infrastructure companies issue preferred equity because the infrastructure business is very capital intensive and such companies need large amounts of capital to build a network to supply telecommunications, gas and electricity to customers. Infrastructure companies can generally pass on their costs of capital to their investors. For a financially healthy company, debt financing is cheaper than preferred equity financing because a company can deduct interest expense from its revenues and therefore have a lower taxable income and lower taxes. The company cannot deduct preferred equity dividends. For a financially distressed company preferred equity may be attractive. While missing a preferred dividend is bad news, it is not necessarily fatal news. The preferred equity holders cannot force the company into insolvency because of a missed preferred dividend. Sometimes preferred shareholders will get a seat on the company's board of directors if a preferred dividend is missed, and usually preferred dividends are cumulative; in other words, all back preferred dividends must be paid before ordinary share dividends can be paid. Most preferred equity is owned by companies rather than individuals since a company can exclude most of its dividend income from its taxes, giving preferred equity a higher after-tax yield to corporate investors than to individual investors.

Note that market capitalisation or market cap shows how investors value a company. It may be completely unrelated to a company's book value equity on its balance sheet. Concerning treasury stock, note that more companies are using more and more options as compensation, and as a result, share repurchases have become more frequent. The company must keep repurchasing shares in order to keep from diluting existing shareholders with too much equity outstanding. A share split should simply be an accounting charge, not affecting the market value of equity. However, the market reaction to a share split is generally positive – investors take a share split as a positive signal that the company is doing well. In

addition, a majority of companies whose share splits increase the dividend within a year's time, and this is seen as a positive, value-increasing event.

While shareholders do have a say in corporate governance, an individual shareholder has little power on his or her own. Ask students how many own shares and then, what is their role in the operations of the company. They will likely agree that they have no say in the decisions the company makes. Ask if any have sent in their proxy to vote in corporate elections or attended an annual meeting. Note that ASIC and the ASX try to look out for the small shareholder through their rules on disclosure of company information. Companies are not allowed to give analysts or large investors information that is not available to all investors. This has led to internet question and answer sessions with analysts that all investors can access.

5-2 Valuing Preferred and Ordinary Shares

Valuation of preferred equity is done through a mathematically easy to use formula, the stable perpetuity formula. Valuing preferred equity is as easy as it seems; simply divide the dollar amount of the dividend by the required return on the preferred equity. Note that the required return on preferred equity is generally close to the coupon rate of an equivalent bond for the company.

Valuing ordinary shares is more difficult than valuing bonds or preferred equity, which both have a known, steady payment. With ordinary shares, questions about the right approach, right planning horizon and dividend growth patterns arise.

- Note that a share's price today is the value of its expected dividend next period and the capital gains return from selling the share a year from now.

If you assume that investors hold ordinary shares indefinitely, then the sale price you receive for the share wanes in importance. The discounted dividends provide more value than a far-into-the-future sale of the equity. This means that shares can be valued as an infinite sum of its future dividends.

5-2a Preferred Equity Valuation

Ordinary shares with a non-growing dividend can be valued exactly like *preferred equity*, with the easy to use stable perpetuity formula. Valuing preferred equity is a very easy process. Note, however, that most companies are growing. Growth is a stated goal of most companies; few would state publicly that the company would never again grow in the future.

5-2b Ordinary Share Valuation Equation

The concept that shares can be valued as a growing perpetuity can sometimes be difficult for students to understand. Time value of money concepts from the previous chapter can help explain this. While a company will not usually have perpetual cash flows at the same growth rate, note that future dividends will be discounted at an exponentially decreasing present value factor, so the future dividends provide less and less of the total value of the equity. So even if an investor does not hold a share forever, the later cash flows have less value.

5-2c Zero Growth

Here valuing ordinary shares is identical to valuing preferred equity.

5-2d Constant Growth

It is also true that a company's dividends do not grow at the same rate forever. However, for a mature, stable company this may be a close enough approximation. Most managers state that an even growth rate is a company goal, and will give close enough answers concerning share valuation. Typically as a company matures, it will settle into a low, long term growth around the rate of inflation. Ask students what company has grown at 20% a year for 15 consecutive years. Few students will think of IBM, which experienced such high growth in the 1960s and 1970s. IBM is no longer a high growth company. The market for computers is much more competitive than it was several decades ago and it is no longer possible to achieve such high rates of growth.

Note also that the growing perpetuity model will not work if the growth rate is greater than the discount rate. If you have a situation where g is greater than r , it most likely means you have done something wrong. Either your discount rate is not high enough to reflect the high risk of the company or,

more likely, the growth rate is too high. The growth rate may not be the long-term, sustainable growth rate for the company. Show students how sensitive the growing perpetuity model is to growth. The higher the growth rate, the exponentially higher the company value. For example, suppose a share will pay a dividend of \$1.00 next period. The discount rate is 10%. Look at how value changes as growth rate changes.

$$P = D_1 / (r - g)$$

$$G = 2\%, P = \$1 / (.1 - 0.02) = \$12.50$$

$$G = 5\%, P = \$1 / (.1 - 0.05) = \$20$$

$$G = 8\%, P = \$1 / (.1 - 0.08) = \$50$$

The growth rate has a huge impact on price.

Note that limitations of the constant growth model include:

- Dividends may not really grow at a constant rate
- The discount rate must be greater than the growth rate for the model to work

5-2e Variable Growth

Note that analysts often use a variable growth model, recognising that dividends may grow at a higher rate in the early years of a company and then may settle into a steady-state growth rate. When using the variable growth in dividends model when a company has a different dividend rate before it settles into its steady growth, point out that the price calculated by the growing perpetuity model is for one period before the dividend used in the numerator of the formula. For example, if you use dividend in year 5, you will calculate a price in year 4 dollars. If you use a dividend in year 68, you will calculate a price in year 67 dollars.

The growing perpetuity model can be used even if the growth rate is negative. Share price will simply be exponentially declining. For example, if a company just pays a dividend of \$1 ($D_0 = \1), and the appropriate discount rate is 10%. If the growth rate is 5%, price is $1(1.05)/(0.1 - 0.05) = \$21.00$. If the company is experiencing declining growth, say it is declining at 5% a year, its share price is $1(0.95)/(0.1 - (-0.05)) = \6.33 . The declining growth rate not only decreases the numerator of the equation, it also increases the denominator, both of which work to decrease share value.

What about companies that do not pay dividends? There has been a decline in the number of companies paying dividends in many western countries. The model is still valid. Even if a company does not pay a dividend and has no intention of declaring a dividend, at very least it will have a liquidating dividend. At some point, when the company dissolves or is acquired, it will pay shareholders their share of the company's assets in liquidation. The present value of this expected future, liquidating dividend is the value of the share price today. If there is a secondary market for the security, then this value can be claimed at any time in the form of capital gains. Companies that don't pay dividends tend to be younger, higher growth companies with lots of investment potential. They generally want to keep their retained earnings to invest in their projects. Often as a company matures, and no longer has as many uses for its retained earnings, it will initiate a dividend payment.

Estimating growth rate is the most difficult part of using the constant growth model equation. There are many security analysts who publish expectations of future growth, or an industry average could be used. Unfortunately, there is a low correlation between past growth and future growth. A study by Chan, Karceski and Lakonishok found almost no correlation between past and future growth. In general, they found that growth was high in the early years of a company, became lower as new companies entered the market and then became high as companies exited the market, making the remaining companies more profitable. This makes it hard to predict long-term trends.

The concept of present value of growth opportunities, PVGO, is gaining popularity. Investors distinguish between growth shares, which they expect will provide them with capital gains, and income shares, which they expect will provide them with dividends. The value of a share in essence has two components, the value of its current earnings if there were no growth and the present value of its growth opportunities. Often the major part of the value of a growth share is its PVGO. A 1996 Brealey and Meyers study found that 34% of total market value of US shares was their PVGO. A 1999 study of United Kingdom 278 shares from 1987-1995 found that PVGO was 66% of market value.

The price/earnings ratio is related to PVGO. The *Wall Street Journal* and other financial press report P/E ratios as a ratio of current price to last year's (trailing) earnings. PVGO is concerned with future earnings that may or may not be similar to past earnings. A high P/E could mean that the company has a high PVGO or it could mean that earnings are relatively safe, and a low discount rate is applied to this share. Or, a high P/E could mean a company's earnings are depressed.

Figure 5.1 Valuing a Share Using the Variable Growth Model

5-2f How to Estimate Growth

The central component in many share pricing models is the growth rate – but how do we find an accurate growth rate? A company's growth rate depends on several factors – sales, dividends, earning or really any other financial performance measure. A simple method for estimating this uses information given on the financial statements. Using the retention rate of the company helps to estimate the growth of future investment opportunities for the company. Using this retention rate multiplied by the ROE gives an estimate of growth. One can also use past or historical data to determine growth in similar economic times.

5-2g What If There Are No Dividends?

This is a common question most students ask. Yahoo!, a consistent growth share has not paid a dividend yet. So to value this company, one must either believe it will one day pay out dividends, or we must use the estimate capital gain as an approximation to a dividend - because everyone believes they will receive cash at some point in the future or they would not buy the share. But there are other ways to evaluate companies that do not pay dividends: the Free Cash Flow is one of those methods.

5-3 The Free Cash Flow Approach to Ordinary Share Valuation

The free cash flow model is like the dividend growth model, except that cash flows are used in place of dividends. Like the dividend growth model, it also works best for more mature, stable companies. The FCF represents total cash available to all investors. Using the simple FCF formula of NOPAT + Depreciation, one can estimate the cash available to investors and then discount it back to the present.

As anyone following the market knows, share prices are very volatile. Investors' expectations of the future prospects of the company are constantly changing as new information is received. Even slight changes in valuation assumptions can have a large impact on value. Growth is a very important part of this model.

- Note that the free cash flow model's output is the total value of the company. In order to value the company's equity, you must take the answer to a free cash flow valuation problem and subtract the company's debt and preferred equity.

5-4 Other Approaches to Ordinary Share Valuation

5-4a Liquidation Value and Book Value

The liquidation value estimates the cash that would remain after a company's assets are sold and liabilities paid. In reality the liquidation value is far below the true market value, due to brand recognition and other intangibles.

The book value also reflects a less valuable measure. This is based on historical costs of the company's assets, adjusted for depreciation, net of the company's liabilities.

5-4b Market Multiples of Comparable Companies

In multiples valuation, a variety of multiples can be used to approximate the value of a company. These tend to be industry-specific. For example, you could value a hospital as a multiple of the number of beds in the hospital, if the cost of supplying a hospital bed included the allocation of fixed overheads such as rent, medical practitioner support, and interest payments on debt.

Price/earnings multiples are very widely used, and work best when net income is high relative to non-cash charges like depreciation. In other words, this is best for companies that have low non-cash charges like depreciation. Price to cash flow works best for companies with high non-cash charges, for example, manufacturing companies. Price to revenues is used for service companies and those with low

assets, like insurance agencies and employment agencies. Dividends to revenues is used for companies that pay regular dividends like infrastructure companies and real estate investment trusts. Price to book value is used in companies where a high proportion of assets and liabilities are current, like banks and financial services companies. Price to operating income may be used when a company has a lot of 'other income' components.

- Note also that differences in marketability can lead to big variations in value of companies that are otherwise equal. If an investor is not sure about his/her ability to re-sell an investment, he will require an illiquidity or lack of marketability discount. Domestic private companies usually are valued 20-30% less than similar public companies when earnings multiples are used to value the company. Private company discounts are even larger for foreign companies, about 40-50%, when compared to similar publicly traded companies.

There could also be a key person discount applied to private companies. If a company is very dependent on a key executive, whose leaving could harm the company, its value may be lower to reflect the possibility of departure. Depending on the nature of the business, there could also be adjustments for key customers or suppliers (if a company were overly depend on a customer or supplier). In addition, if the purchaser is buying a controlling interest, then a control premium must be added in.

Selecting comparable companies is at least as much art as science. Comparable companies should ideally have similar lines of business, capital structures, growth prospects, size, maturity, diversification, etc.

- Student Interaction: Ask students which they think is better – using comparables or using discounted cash flow. A Kaplan and Ruback study in 1996 found a high correlation between DCF and comparable valuations. They found that the best estimates used both methods. They concluded that comparables might be better than DCF because they use current market expectations of future cash flows and discount rates, which are incorporated into the multiple. However, it is difficult to find comparables that are perfect, or even good, matches for the subject company.

5-5 Primary and Secondary Markets for Equity Securities

5-5a Investment Banking Functions and the Primary Market

Few companies offer equity directly to non-employed investors. A company typically must use the services of an investment bank to price and market its new equity issues. A seasoned equity offering is a fairly infrequent occurrence. Companies rely more on internal finance, and then debt financing, before issuing new equity. There have been some very prominent initial public offerings. Google recently completed an unusual Dutch auction IPO, in which investors, even small investors, could bid on as few as five shares.

- Ask students which is riskier (and to whom): a best efforts or a firm commitment IPO. Student will agree a firm commitment IPO is riskier for the investment bank, which will require a higher reward – typically in the form of higher fees – for this kind of offering. Or, the investment bank will purposely underprice the share issue to ensure that all shares will be sold.

There are a number of possible explanations for 'hot markets' and for the fact that there tends to be more underpricing of IPOs (higher first day gains) in hot markets.

- Perhaps there are changes in company risk. If 'everyone' is doing an IPO, then the riskier and harder to price companies may be in the market. When there is more risk, and when it is harder to evaluate the risk of a company, there will be more underpricing.
- There may be momentum in hot markets. Investors may be willing to pay more, bidding up the price of a new issue, because they believe the overall market is going up. This can make first day gains a self-fulfilling prophecy.
- There may be 'windows of opportunity,' periods of time when investors are very optimistic about the growth potential of new companies.

The peak of the technology boom especially in the US during the period 1997-2000 saw a record number of IPOs and money raised from IPOs and by venture capitalists. For example, 1999 venture capital investments were larger than the previous three years combined in both Australia and the US. Internet companies received much of venture capital money, twice the percentage they received in 1998. In 1999 in the US, IPOs raised over \$75 billion in new equity, which is about equal to the amount raised in new share issues in the entire decade of the 1980s.

An IPO or a secondary offering after an IPO can be very profitable for a company's founders. For example, eBay's founder received close to \$130 million from the sale of 790,000 of his 37.6 million shares of shares in eBay's secondary offering in April 1999. (The company did its IPO in September 1998.) In another example, 20-year-old Christopher Klaus founded Internet Services Systems in 1994. The company went public in 1998, giving Klaus a \$160 fortune in his remaining 26% ownership of the company. Not just owners can become rich. Over 2,000 Microsoft employees have become millionaires through exercising employee share options.

At the peak of the IPO boom, many companies, in particular internet companies, had a huge first day 'pop', in other words a large increase in price on the opening day of trading. The IPO 'boom' in the US began in September 1998 with a 606% first day gain for theglobe.com. One of the highest gains was VA Linux Systems IPO, in which the share closed at \$239.25, up 700% on the first day of trading from the offer price of \$30. From 1975-1998, 39 IPOs more than doubled in price on the first trading day. In 1999 alone 84 IPOs more than doubled in price on the first trading day. This means that a great deal of money was 'left on the table.' The IPO could have been priced higher, netting the issuing company more money and the investment banker higher fees. In fact, it is estimated that \$29 billion was left on the table in 1999, compared to \$27 billion left on the table in the previous 9 years combined. (To put this in perspective, note that \$29 billion was more than the GDP of Bolivia.)

Green shoe provisions refer to extra shares that can be sold to the public if demand is great enough. Note that it is difficult for an average investor to profit from IPOs. Typically, shares in the 'best' IPOs go to favoured clients of the investment bank managing the IPO. The Google IPO was an exception; investors could purchase as few as five shares. Investment banks gauge demand through book building – seeing how many shares and at what price large institutional investors might be interested in purchasing.

5-5b Secondary Markets for Equity Securities

Note that most share trading in developed countries is done electronically, with little need for a physical location for an exchange. A group of exchange students at one university were excited about touring the Paris Bourse, or stock exchange, only to find no one was there – all the traders were at their computers at various locations around the country. The ASX has had no physical trading floor since it became an electronic exchange in 1990. The new stock exchange in Australia, Chi-X, is also only online. More trading occurs on the secondary market than on the primary market. On the secondary market, new shares are not being created: ownership is simply changing hands.

Chapter 5 Resource Articles

'What Makes a Stock a Value?' *Money*, July 2011. This article discusses some of the more common methods used to value a stock including price/earnings measures. She discusses the terminology and what to look for in P/E measures to find a valuable stock.

'The Ultimate Value Investors,' *Business Week*, 10 June 2002. This article discusses value investing – with a twist. The new value investors are a hybrid of the 1980s corporate raiders and the 1990s shareholder activists. They want to challenge existing management to create value for their companies.

Enrichment Exercise

1. Ask students if they think managers can manipulate share prices by increasing dividends? The answer is that perhaps they can over the short term. An announcement that dividends are being increased is considered good news by the market and share price rises. However, if the

company really doesn't have higher cash flows to back up the higher earnings, the market will soon see through the move and share price will return to its original level.

2. Have students examine the multiples of several of their favourite companies – do any of the companies appear to be undervalued according to the multiple method?

Answers to Concept Review Questions

1. Ordinary shareholders are residual owners because they are entitled to receive cash only after all other creditors and preferred shareholders have been paid. Because ordinary shareholders receive their compensation from 'the residual' or whatever is left over after everyone else has been paid, their claim is especially risky. As compensation for taking that risk, ordinary shareholders can earn much higher returns than can creditors and preferred shareholders, and ordinary shareholders also have the right to vote on important corporate matters, whereas preferred shareholders and bond holders may not vote on such matters.

Relative to each other, preferred shareholders have a riskier position than bondholders because bondholders have a more senior claim against assets. Consequently, the expected return for preferred shareholders is higher than the return for bondholders.

2. Outside shareholders clearly have less control of the company relative to top management in this instance. Because outside shareholder representation is diluted, the share price will be lower as a consequence.
3. It's appropriate to use the perpetuity formula from Chapter 3 to estimate the value of preferred equity because this formula applies to a level stream of cash flows that never ends. Preferred shares generally pay a fixed dividend, and they do not have a specific maturity date.
4. Selling an ordinary share bestows the right to receive all future payments paid by the company to shareholders. The prospect of receiving cash payments over time gives an ordinary share its value.
5. Using a dividend forecast of \$2.79, a required return of 10%, and a growth rate of 2.75 %, we obtained a price for Cochlear of \$38.48. If the market's required return on Cochlear's shares increased, the share price would fall because the market would be discounting the company's cash flows at a higher rate. This is the same inverse relationship between discount rates and security prices that we learned about in the chapter for bonds.
6. Valuing companies that pay no dividends using a dividend discount model is difficult because it is very hard to predict when the company will start paying dividends, how large the initial dividend payment will be, and how fast it might grow. The free cash flow approach to valuing an enterprise can be used to resolve the valuation challenge presented by companies that do not pay dividends by valuing the cash flows that the company COULD distribute. The free cash flow approach differs from the dividend valuation model in that the dividend discount model calculates the present value of an actual dividend stream, while the free cash flow model takes the present cash flow models takes the present value of the cash flows that a company generates, net of the cash that the company needs to pay expenses and make new investments.
7. Book value measures the costs of a company's assets, net of accumulated depreciation. Subtract off the historic value of the company's liabilities and you have the book value of the company's equity. Liquidation value measures how much cash a company could raise from a one-time sale of its assets (again, subtracting off what is needed to pay creditors). Neither of these measures is forward-looking as is the discounted cash flow approach. If the company is a going concern, then a forward-looking approach is preferred because it can potentially capture the value of future growth opportunities as opposed to what the company's assets can fetch once it is 'dead and gone'.

8. A company may have a high P/E ratio simply because E is unusually small in a particular quarter or year. Also, the P/E ratio can be influenced by how risky the company is. If we have two companies with identical expected growth rates and identical current earnings, the company that is less risky may have a higher P/E ratio because investors discount its future earnings at a lower rate than they use to discount the earnings of the riskier company. Finally, we have noted in several places in this chapter that growth rates are notoriously difficult to predict. Thus, it is dangerous and possibly foolish to conclude that a company with a higher P/E ratio will probably grow faster than will a company with a lower P/E ratio.
9. 'Primary market' refers to a company's first particular security issuance. The secondary market allows liquidity for those who hold those securities, since it is where the daily back and forth trading of securities takes place. Organised exchanges are physical locations where investors come together to trade, while the OTC market is a decentralised market of interconnected traders and dealers.
10. Underwriters earn the underwriting spread, which typically equals about seven per cent of the money raised in an equity IPO and about 0.5 per cent in a large debt offering.
11. Road shows allow companies and their investment bankers to preliminarily assess the degree of demand for the company's shares at different possible prices. Such information helps the banker set the offering price.
12. The issuing company only receives cash in the primary market transaction. In a secondary market transaction, cash simply flows from the investor buying the shares to the investor selling the shares. The company is not a party to the secondary market transaction.

Answers to Self-Test Problems

ST5-1. Omega Healthcare Investors (ASX symbol, OHI) pays a dividend on its Series B preferred equity of \$0.539 per quarter. If the price of Series B preferred equity is \$25 per share, what quarterly rate of return does the market require on this equity, and what is the effective annual required return?

A: The preferred share valuation formula says that the price equals the dividend divided by the required rate of return. Therefore, using the quarterly dividend and the quarterly required rate, we have

$$\begin{aligned} \$25 &= \$0.539/r \\ r &= 0.02156 \end{aligned}$$

This means that the effective annual required rate on the share equals $(1.02156)^4 - 1 = 0.089$ or 8.9%.

ST5-2. McDonald's Corporation announced an increase of their quarterly dividend from \$0.55 to \$0.61 per share in September 2010. This continued a long string of dividend increases. McDonald's was one of a few companies that had managed to increase its annual dividend at a double-digit clip for many years, including through the financial crisis and recession from 2007-2009. Suppose you want to use the dividend growth model to value McDonald's equity. You believe that dividends will grow at 7 % per year indefinitely, and you think the market's required return on this share is 11 %. Let's simplify by assuming that McDonald's pays dividends annually and that the next annual dividend is expected to be \$2.44 per share. The dividend will arrive in exactly one year. What would you pay for McDonald's equity right now? Suppose you buy the equity today, hold it just long enough to receive the next dividend, and then sell it. What rate of return will you earn on that investment?

A: Value today = $\$2.44 / (0.11 - 0.07) = \61 .

If you buy the share today you pay \$61. Next year you receive a \$2.44 dividend, and you sell the share. At what price will the share sell one year from now? The next dividend will be 7% higher than the last one:

$$\$2.44 \times 1.07 = \$2.61$$

So an investor would take that value and apply the constant growth model as follows:

$$\text{Value next year} = \$2.61 / (0.11 - 0.07) = \$65.25.$$

So the selling price after one year is \$65.25. The total return for the initial investor is the dividend received, \$2.44, plus the \$4.25 capital gain (\$65.25 – \$61), or \$6.69. On a percentage basis, the return is $\$6.69 / \61 or 11%, just the required return specified in the problem.

Answers to End-of-Chapter Questions

Q5-1. How are preferred shares different from ordinary shares?

A5-1. Ordinary shares usually grant the investor the right to vote on important corporate decisions. Preferred equity does not. Preferred shareholders have a higher priority claim than common shareholders because common shareholders cannot receive dividends unless all dividends owed to preferred shareholders have been paid. Both ordinary and preferred equity have a lower priority claim than debt, however. Finally, preferred dividends are usually set at a fixed percentage of par value, while common dividends vary with the profitability of the company.

Q5-2. How do you estimate the required rate of return on a share of preferred equity if you know its market price and its dividend?

A5-2. Divide the annual dividend by the market price to obtain the required return.

Q5-3. The value of ordinary shares cannot be tied to the present value of future dividends because most companies don't pay dividends. Comment on the validity, or lack thereof, of this statement.

A5-3. It is true that most shares don't pay dividends, and forecasting when those shares will begin paying dividends is very difficult, so in that sense the statement has some validity. However, the value of a share depends not just on dividends, but on other forms of cash distributions such as share purchases and cash takeover payments. Regardless of what form a share distributes its cash, investors must have some expectation that at some point the share will distribute cash to investors; otherwise the share would have no value.

Q5-4. A common fallacy in stock market investing is assuming that a good company makes a good investment. Suppose we define a good company as one that has experienced rapid growth (in sales, earnings, or dividends) in the recent past. Explain the reasons why shares of good companies may or may not turn out to be good investments.

A5-4. If a company has enjoyed rapid growth in the past, it is likely that the expectation that this growth will continue may already be incorporated into the share's price. For example, if the market expects company A to grow much faster than company B, then company A's equity may trade at a much higher price/earnings ratios than company B's equity does. Whether or not company A's equity turns out to be a good investment really depends on whether its future growth turns out to be faster or slower than what the market already anticipates.

- Q5-5.** Why is it not surprising to learn that growth rates rarely show predictable trends?
- A5-5.** Competition makes growth largely unpredictable. High-growth industries attract new competitors, and more competition will lead to lower growth for some or all of the companies in the industry. Low-growth industries may see some companies exit, which could improve growth opportunities for the companies that remain. Over time, the dynamic effects of competition make it very difficult to predict which companies will enjoy above average or below average growth going forward.
- Q5-6.** The book value of a company's common equity is usually lower than the market value of the ordinary shares. Why? Can you describe a situation in which the liquidation value of a company's equity might exceed its market value?
- A5-6.** Market values are forward looking, while book values are backward looking. If the market is optimistic about a company's future, it will almost always place a higher value on the company's shares than book value. However, the opposite could be true. Suppose a company is in the business of producing a product that suddenly becomes technically obsolete. The book value of the company's assets might still be considerable, but the market will see problems ahead and assign a very low market value to the company's equity. If the company cannot replace the technically obsolete product with a more competitive one, it could be the case that the company's shareholders would be better off selling the company's remaining assets in a liquidation rather than letting the company continue to operate. Allowing the company to continue operations might only result in losses going forward. Given that shutting down a company is a very difficult decision, the market might anticipate that the company will not shut down as quickly as it should, so the share price reflects not what the company might be worth today if it were liquidated, but a lower value that reflects a continued period of losses.
- Q5-7.** What is a prospectus?
- A5-7.** A prospectus is a document that underwriters prepare for a company issuing securities in the primary market. The prospectus provides extensive information about both the company and the security being issued. The prospectus is the primary source of information that investors used to evaluate the security issue.
- Q5-8.** Describe the role of the lead underwriter in a *firm-commitment offering*.
- A5-8.** In a firm-commitment offering, the investment bank agrees to buy the securities from the issuing company and resell them to investors. Because the investment bank takes possession of the securities, they bear some risk that the value of the securities can change. The underwriting syndicate shares responsibility for selling the issue. In general the syndicate tries to oversubscribe the issue. This should mean that the issue is easier to sell and that the risk to the investment banker of holding a security that is dropping in value is low.
- Q5-9.** Why is the relationship between an investment banker and a company selling securities somewhat adversarial?
- A5-9.** The investment bank deals with large investors, mostly institutions like mutual funds, insurance companies, and pension funds, each time it brings new securities to market. In contrast, the investment bank issues new securities for a company infrequently. The institutional investor clients of the bank want the lowest price possible for the securities they are buying, but the issuing company wants a high price so that it raises more money. Therefore, there is a natural conflict of interest between the two client groups that investment banks serve. This makes the relationship between a company and its investment bank rather tense at times.

Q5-10. Does secondary market trading generate capital for the company whose shares it is trading?

A5-10. No. The company raises capital when it sells shares in the primary market. Subsequent trading determines what the price of the share is and who owns the share, but it does not generate any additional cash for the company.

Solutions to End-of-Chapter Problems

Valuing Preferred and Ordinary Shares

P5-1. Argaiv Towers has outstanding an issue of preferred equity with a par value of \$100. It pays an annual dividend equal to 8 % of par value. If the required return on Argaiv preferred equity is 6 %, and if Argaiv pays its next dividend in one year, what is the market price of the preferred equity today?

A5-1. $\$8 / 0.06 = \133.33

P5-2. Artivel Mining Corp.'s preferred equity pays a dividend of \$5 each year. If the shares sell for \$40 each and the next dividend will be paid in one year, what return do investors require on Artivel preferred equity?

A5-2. $\$5/r = \40
 $r = 0.125$, or 12.5%

P5-3. Silaic Tools has issued preferred equity that offers investors a 10 % annual return. A share currently sells for \$80, and the next dividend will be paid in one year. How much is the dividend?

A5-3. $\$X / 0.10 = \80
 $X = \$8$

P5-4. Suppose a preferred equity pays a quarterly dividend of \$2 per share. The next dividend comes in exactly one-fourth of a year. If the price of the share is \$80, what is the effective annual rate of return that the share offers investors?

A5-4. $\$2/r = \80 $r = 0.025$ is the quarterly return

$$1.025^4 - 1 = 0.1038 \text{ or } 10.38\%$$

P5-5. A particular preferred share pays a \$1 quarterly dividend and offers investors an effective annual rate of return of 12.55 %. What is the price per share?

A5-5. The quarterly rate of return is $(1.1255)^{1/4} - 1 = 0.03$ or 3%. Therefore the price equals $\$1/0.03 = \33.33 .

P5-6. C. Alice Stone Pty Ltd's ordinary shares have paid a \$3 dividend for so long that investors are now convinced that the equity will continue to pay that annual dividend forever. If the next dividend is due in one year and investors require an 8% return on the equity, what is its current market price? What will the price be immediately after the next dividend payment?

A5-6. $P = \$3/0.08 = \37.50 is the current price. However, as soon as the next dividend payment is made, another dividend of \$3 will be due a year later, so the price at that time is also \$37.50. There is no expected appreciation in the share price. The entire 8% return comes from the share's dividend yield.

P5-7. Propulsion Sciences' (PS) share dividend has grown at 10 % per year for many years. Investors believe that a year from now the company will pay a dividend of \$3 and that dividends will continue their 10 % growth indefinitely. If the market's required return on PS equity is 12 %, what does the share sell for today? How much will it sell for a year from today after the shareholders receive their dividend?

A5-7. The price today is $\$3/(0.12 - 0.10) = \150 . A year from now the \$3 dividend will be history, with the next dividend in the sequence of \$3.30 expected a year later. This means the share price just after the \$3 dividend payment should be $\$3.30/(0.12 - 0.10) = \165 . Notice that this represents a 10 % growth in the share price, exactly matching the 10 % increase in the dividend.

P5-8. Investors believe that a certain share will pay a \$4 dividend next year. The market price of the share is \$66.67, and investors expect a 12 % return on the share. What long-run growth rate in dividends is consistent with the current price of the share?

A5-8. $\$66.67 = \$4 / (0.12 - g)$
 $g = 0.06$, or 6%

P5-9. Gail Dribble is analysing the shares of Petscan Radiology. Petscan's equity pays a dividend once each year, and it just distributed this year's \$0.85 dividend. The market price of the share is \$12.14. Gail estimates that Petscan will increase its dividends by 7 % per year forever. After contemplating the risk of Petscan equity, Gail is willing to hold the shares only if they provide an annual expected return of at least 13 %. Should she buy Petscan shares or not?

A5-9. $\$12.14 = (0.85 \times 1.07) / (r - 0.07)$
 $r = 0.145$ or 14.5%

The share is priced at a level that provides a 14.5% return to investors, so it should be attractive to Gail.

P5-10. Carbohydrates Anonymous (CA) operates a chain of weight-loss centres for carb lovers. Its services have been in great demand in recent years and its profits have soared. CA recently paid an annual dividend of \$1.35 per share. Investors expect that the company will increase the dividend by 20 % in each of the next three years, and after that they anticipate that dividends will grow by about 5 % per year. If the market requires an 11 % return on CA equity, what should the share sell for today?

A5-10. The dividend stream for the next few years looks like this:

| | |
|-----------|--------------------------------|
| Next year | \$1.62 (up 20% from this year) |
| 2nd year | \$1.944 (up 20%) |
| 3rd year | \$2.333 (up 20%) |
| 4th year | \$2.449 (up 5%) |

$$P = \frac{1.62}{1.11} + \frac{1.944}{1.11^2} + \frac{2.333}{1.11^3} + \frac{1}{1.11^3} \times \frac{2.449}{0.11 - 0.05} = 34.59$$

P5-11. Hill Propane Distributors sells propane gas throughout the coast of Western Australia. Because of population growth and a construction boom in recent years, the company has prospered and expects to continue to do well in the near term. The company will pay a \$0.75 per share dividend to investors one year from now. Investors believe that Hill Propane will increase that dividend at 15 % per year for the subsequent 5 years before settling down to a long-run

dividend growth rate of 3 %. Investors expect an 8 % return on Hill Propane common shares. What is the current selling price of the share?

A5-11. The dividend stream for the next few years looks like this:

| | |
|-----------|-------------------|
| Next year | \$0.75 |
| 2nd year | \$0.8625 (up 15%) |
| 3rd year | \$0.9919 (up 15%) |
| 4th year | \$1.1406 (up 15%) |
| 5th year | \$1.3118 (up 15%) |
| 6th year | \$1.5085 (up 15%) |
| 7th year | \$1.5538 (up 3%) |

$$P = \frac{0.75}{1.08} + \frac{0.8625}{1.08^2} + \frac{0.9919}{1.08^3} + \frac{1.1406}{1.08^4} + \frac{1.3118}{1.08^5} + \frac{1.5085}{1.08^6} + \frac{1}{1.08^6} \times \frac{1.5538}{0.08 - 0.03} = 24.49$$

- P5-12.** Yesterday, 22 September 2012, Wireless Logic Corp. (WLC) paid its annual dividend of \$1.25 per share. Because WLC's financial prospects are particularly bright, investors believe that the company will increase its dividend by 20 % per year for the next four years. After that, investors believe WLC will increase the dividend at a modest annual rate of 4%. Investors require a 16 % return on WLC equity, and WLC always makes its dividend payment on 22 September of each year.
- What is the price of WLC shares on 23 September 2012?
 - What is the price of WLC shares on 23 September 2013?
 - Calculate the percentage change in price of WLC equity from 23 September 2012, to 23 September 2013.
 - For an investor who purchased WLC shares on 23 September 2012, received a dividend on 22 September 2013, and sold the shares on 23 September 2013, what was the total rate of return on the investment? How much of this return came from the dividend, and how much came from the capital gain?
 - What is the price of WLC shares on 23 September 2016?
 - What is the price of WLC shares on 23 September 2017?
 - For an investor who purchased WLC shares on 23 September 2016, received a dividend on 22 September 2017, and sold the shares on 23 September 2017, what was the total rate of return on the investment? How much of this return came from the dividend, and how much came from the capital gain? Comment on the differences between your answers to this question and your answers to part (d).

A5-12. a. $P = \frac{1.50}{1.16} + \frac{1.80}{1.16^2} + \frac{2.16}{1.16^3} + \frac{2.592}{1.16^4} + \frac{1}{1.16^4} \times \frac{2.696}{0.16 - 0.04} = 17.85$

b. $P = \frac{1.80}{1.16^1} + \frac{2.16}{1.16^2} + \frac{2.592}{1.16^3} + \frac{1}{1.16^3} \times \frac{2.696}{0.16 - 0.04} = 19.21$

c. $(19.21/17.85) - 1 = 0.0762$ or 7.62%

d. $(19.21 + 1.50 - 17.85) / 17.85 = 0.1602$, or 16.02%. Actually, it would be 16% exactly without rounding errors. Of this about 7.6% is a capital gain and the rest is the dividend yield.

e. $P = 2.696 / (0.16 - 0.04) = \22.47

f. $P = 2.804 / (0.16 - 0.04) = \23.37

- g. The return is $(23.37 + 2.696 - 22.47) / 22.47 = 0.16$ or 16%. Again we are earning exactly the required return on the shares. However, now that the equity has entered its constant growth period, the share price increases by 4 % per year, just equal to the dividend growth rate, and the remaining 12 % of our return comes from the dividend.

P5-13. Today's date is 30 March 2012. E-Pay Pty Ltd ordinary shares pay a dividend every year on 29 March. The most recent dividend was \$1.50 per share. You expect the company's dividends to increase at a rate of 25 % per year until 29 March 2015. After that, you expect that dividends will increase at 5 % per year. Investors require a 14 % return on E-Pay shares. Calculate the price of the shares on the following dates: 30 March 2012; 30 March 2016; and 30 September 2013.

A5-13. The prices on the respective dates are

$$\text{On 30/3/2012 } P = \frac{1.875}{1.14} + \frac{2.344}{1.14^2} + \frac{2.93}{1.14^3} + \frac{1}{1.14^3} \times \frac{3.076}{0.14 - 0.05} = \$28.49$$

$$\text{On 30/3/2016 } P = 3.23 / (0.14 - 0.05) = \$35.89$$

Now, to find the price on 30-9-2013, we must first find the price on 30-3-2013 and then increase it by 14% for half a year. We know that between 30 March and 30 September 2013, the equity pays no dividend, but investors still require a 14% annual return over that period, so the share price must appreciate to provide that return, roughly a 7% increase.

$$\text{On 30/3/2013 } P = \frac{2.344}{1.14^1} + \frac{2.93}{1.14^2} + \frac{1}{1.14^2} \times \frac{3.076}{0.14 - 0.05} = \$30.61$$

Six months later, on 30-9-2013, the share price should be $\$30.61(1.14)^{0.5} = \32.68 .

P5-14. One year from today, investors anticipate that Groningen Distilleries Pty Ltd equity will pay a dividend of \$3.25 per share. After that, investors believe that the dividend will grow at 20% per year for three years before settling down to a long-run growth rate of 4%. The required rate of return on Groningen stock is 15%. What is the current share price?

A5-14. Here is the series of expected dividends for the next few years:

$$D_1 = \$3.25$$

$$D_2 = \$3.25 \times 1.2 = \$3.9$$

$$D_3 = \$3.9 \times 1.2 = \$4.68$$

$$D_4 = \$4.68 \times 1.2 = \$5.62$$

$$D_5 = \$5.62 \times 1.04 = \$5.84$$

$$P_4 = (\$5.84) / (0.15 - 0.04) = \$53.10$$

$$P_0 = \frac{3.25}{1.15^1} + \frac{3.90}{1.15^2} + \frac{4.68}{1.15^3} + \frac{5.62}{1.15^4} + \frac{53.10}{1.15^4}$$

$$P_0 = 2.83 + 2.95 + 3.08 + 3.21 + 30.36 = \$42.43$$

P5-15. Investors expect the following series of dividends from a particular ordinary share:

| | |
|--------|--------|
| Year 1 | \$1.10 |
| Year 2 | \$1.25 |
| Year 3 | \$1.45 |
| Year 4 | \$1.60 |
| Year 5 | \$1.75 |

After the fifth year, dividends will grow at a constant rate. If the required rate of return on this equity is 9 % and the current market price is \$45.64, what is the long-term rate of dividend growth expected by the market?

$$\text{A5-15. } P = \frac{1.10}{1.09} + \frac{1.25}{1.09^2} + \frac{1.45}{1.09^3} + \frac{1.60}{1.09^4} + \frac{1.75}{1.09^5} + \frac{(D_6/(0.09 - g))}{1.09^5} = 45.64$$

$$\text{where } D_6 = 1.75 \times (1+g)$$

Solving this equation for g:

$$1.009 + 1.052 + 1.120 + 1.133 + 1.137 + \frac{1.75(1+g)/(0.09 - g)}{1.09^5} = 45.64$$

$$\frac{1.75(1+g)/(0.09 - g)}{1.09^5} = 40.189$$

$$1.75 (1+g) / (0.09 - g) = 40.189 (1.09)^5 = 61.836$$

$$1.75 (1+g) = 61.836 (0.09 - g)$$

$$1.75 + 1.75g = 5.565 - 61.836g$$

$$63.586g = 3.815$$

$$g = 3.815 / 63.586 = .06, \text{ or } 6\%$$

P5-16. In the constant-growth model we can apply the equation that $P = D \div (r-g)$ only under the assumption that $r > g$. Suppose someone tries to argue with you that for a certain share, $r < g$ forever, not just during a temporary growth spurt. Why can't this be the case? What would happen to the share price if this were true? If you try to answer simply by looking at the formula you will almost certainly get the wrong answer. Think it through.

A5-16. The requirement that $r > g$ means that the cash flows that a company pays in the long run cannot grow faster than the rate used to discount them. Suppose the opposite were true. If there is a company that increases its dividends by, say, 12% per year while the discount rate was just 10% per year, then each subsequent year's dividend would have a present value greater than the previous year's dividend. If you add up an infinite stream of dividends with increasing present values, then you will get an infinitely large share price.

P5-17. Stephenson Technologies (ST) produces the world's greatest single-lens-reflex (SLR) camera. The camera has been a favourite of professional photographers and serious amateurs for several years. Unfortunately, the camera uses old film technology and does not take digital pictures. Ron Stephenson, owner and CEO of the company, decided to let the business continue for as long as it can without making any new R&D investments to develop digital cameras. Accordingly, investors expect ST ordinary shares to pay a \$4 dividend next year and shrink by 10 % per year indefinitely. What is the market price of ST equity if investors require a 12 % return?

$$\text{A5-17. } P = \$4 / (0.12 - (-0.10)) = \$4 / 0.22 = \$18.18$$

The Free Cash Flow Approach to Ordinary Share Valuation

P5-18. Roban Corporation is considering going public but is unsure of a fair offering price for the company. Before hiring an investment banker to assist in making the public offering, managers

at Roban have decided to make their own estimate of the value of the company's ordinary shares. The company's CFO gathered the following data for performing the valuation using the free cash flow valuation model.

The company's weighted average cost of capital is 12 %. It has \$1,400,000 of debt at market value and \$500,000 of preferred equity at its assumed market value. The estimated free cash flows over the next five years, 2013 to 2017, follow. Beyond 2017, to infinity, the company expects its free cash flow to grow by 4 % annually.

| Year | Free Cash Flow |
|------|----------------|
| 2013 | \$250,000 |
| 2014 | \$290,000 |
| 2015 | \$320,000 |
| 2016 | \$360,000 |
| 2017 | \$400,000 |

- Estimate the value of Roban Corporation's entire company by using the *free cash flow approach*.
- Use your finding in part (a), along with the data provided above, to find Roban Corporation's ordinary share value.
- If the company plans to issue 220,000 ordinary shares, what is its estimated value per share?

A5-18. a. The total value of the company equals

$$\frac{250,000}{1.12} + \frac{290,000}{1.12^2} + \frac{320,000}{1.12^3} + \frac{360,000}{1.12^4} + \frac{1}{1.12^4} \times \frac{400,000}{0.12 - 0.04} = \$4,088,547$$

- Of this amount, \$1.4 million is debt and \$0.5 million is preferred equity, so the total value of Roban's ordinary shares is \$2,188,547.
- The price per share would be $\$2,188,547 / 220,000 = \9.95 .

P5-19. Dean and Estevez Pty Ltd (D&E) is a company that provides temporary employees to businesses. D&E's client base has grown rapidly in recent years, and the company has been quite profitable. The company's co-founders, Mr Dean and Mr Estevez, believe in a conservative approach to financial management and therefore have not borrowed any money to finance their business. A larger company in the industry has approached D&E about buying them out. In the most recent year, 2012, D&E generated free cash flow of \$1.4 million. Suppose that D&E projects that these cash flows will grow at 15% per year for the next four years, and then will settle down to a long-run growth rate of 7% per year. The cofounders want a 14% return on their investment. What should be their minimum asking price from the potential acquirer?

A5-19. The free cash flow forecasts look like this:

| | |
|------|----------------------|
| 2012 | \$1,610,000 (up 15%) |
| 2013 | \$1,851,500 (up 15%) |
| 2014 | \$2,129,225 (up 15%) |
| 2015 | \$2,448,609 (up 15%) |
| 2016 | \$2,620,011 (up 7%) |

Use the variable growth model to calculate the present value of the stream and you obtain a total enterprise value of

$$\frac{1,610,000}{1.14} + \frac{1,851,500}{1.14^2} + \frac{2,129,225}{1.14^3} + \frac{2,448,609}{1.14^4} + \frac{1}{1.14^4} \times \frac{2,620,011}{0.14 - 0.07} = \$27,884,701$$

Because there is no debt or preferred shares, this is the value of the ordinary equity. At this price, the cofounders earn a 14 per cent return on their investment, so this should be their minimum asking price.

Other Approaches to Ordinary Share Valuation

P5-20. Dauterive Barber Shops (DBS) specialises in providing quick and inexpensive haircuts for middle-aged men. The company retains about half of its earnings each year and pays the rest out as a dividend. Recently, the company paid a \$3.25 dividend. Investors expect the company's dividends to grow modestly in the future, about 4 per cent per year, and they require a 9 per cent return on DBS shares. Based on next year's earnings forecast, what is DBS's price/earnings ratio? How would the price/earnings ratio change if investors believed that DBS's long-run growth rate was 6 per cent rather than 4 per cent? Retaining the original assumption of 4 per cent growth, how would the price/earnings ratio change if investors became convinced that DBS was not very risky and were willing to accept a 7 per cent return on their shares going forward?

A5-20. Next year's dividend will be $\$3.25 \times 1.04$ or $\$3.38$. This means next year's earnings are about $\$6.76$. The current share price is $\$3.38 / (0.09 - 0.04) = \67.60 , so the P/E ratio based on next year's earnings is $67.60 / 6.76 = 10$. If investors believe the long-run growth rate was 6%, then next year's dividend would be $\$3.445$, next year's earnings would be $\$6.89$, and the share price would be $\$114.83$. Therefore, the P/E ratio would be 16.67. Going back to the original assumptions, if the required return fell from 9% to 7%, dividends and earnings would not change, but the price would rise to 112.67 and the P/E would rise to 16.67.

Primary And Secondary Markets for Equity Securities

P5-21. Owners of the Internet bargain site FROOGLE.com have decided to take their company public by conducting an initial public offering of ordinary shares. They have agreed with their investment banker to sell 3.3 million shares to investors at an offer price of \$14 per share. The underwriting spread is 7 per cent.

- What is the net price that FROOGLE.com will receive for their shares?
- How much money will FROOGLE.com raise in the offering?
- How much do FROOGLE.com's investment bankers make on this transaction?

A5-21. If the underwriting spread is 7 per cent, then the net price is $0.93 \times \$14$ or $\$13.02$ per share. FROOGLE.com will raise $\$13.02 \times 3.3$ million or $\$42,966,000$ in the offering, and the investment bankers will make $(\$14 - \$13.02) \times 3.3$ million or $\$3,234,000$.

P5-22. An investor pays \$101 to buy a share of Zenotrop stock. Simultaneously, a different investor sells one share of Zenotrop and receives \$100 in cash. At the moment that these trades took place, what were the bid and ask prices of Zenotrop shares?

A5-22. \$101 is the ask price (the price at which an investor can buy a share) and \$100 is the bid price (the price at which an investor can sell a share).

P5-23. Day trading, which typically refers to the practice of buying a share and selling it very quickly (on the same day), was a popular activity during the Internet share boom in the late 1990s. If a certain share currently has a bid price of \$50 and an ask price of \$51, by how much would the share price have to increase on a single day for a day trader to make a profit (assume that the bid-ask spread remains fixed throughout the day)?

A5-23. The day trader will buy the share at \$51 (ask price) and will need the bid price to rise above \$51 in order to make a profit. Correspondingly, the ask price will need to rise above \$52. In other

words, the share price would have to increase by more than \$1 (or roughly more than 2%) for a trader to make money.

Answer to MiniCase

Valuing Shares

Your investment adviser has sent you three analyst reports for a young, growing company named Sydney Chips Pty Ltd. These reports depict the company as speculative, but each one poses different projections of the company's future growth rate in earnings and dividends. All three reports show that Sydney Chips earned \$1.20 per share in the year ended previously. There is consensus that a fair rate of return to investors for this ordinary share is 14 per cent, and that management expects to consistently earn a 15 per cent return on the book value of equity ($ROE = 15$ per cent).

Assignment

1. The analyst who produced report A makes the assumption that Sydney Chips will remain a small, regional company that, although profitable, is not expected to grow. In this case, Sydney Chips' management is expected to elect to pay out 100 per cent of earnings as dividends. Based on this report, what model can you use to value the ordinary shares in Sydney Chips? Using this model, what is the value?
2. The analyst who produced report B makes the assumption that Sydney Chips will enter the national market and grow at a steady, constant rate. In this case, Sydney Chips' management is expected to elect to pay out 40 per cent of earnings as dividends. This analyst discloses news that this dividend has just been committed to current shareholders. Based on this report, what model can you use to value the ordinary shares in Sydney Chips? Using this model, what is the value?
3. The analyst who produced report C also makes the assumption that Sydney Chips will enter the national market but expects a high level of initial excitement for the product that is then followed by growth at a constant rate. Earnings and dividends are expected to grow at a rate of 50 per cent over the next year, 20 per cent for the following two years, and then revert back to a constant growth rate of 9 per cent thereafter. This analyst also discloses that Sydney Chips' management has just announced the payout of 40 per cent of the recently reported earnings to current shareholders. Based on this report, what model can you use to value the ordinary shares in Sydney Chips? Using this model, what is the value?
4. Discuss the feature(s) that drives the differing valuation of Sydney Chips. What additional information do you need to garner confidence in the projections of each analyst report?

Answers

1. Zero-growth model:
 $EPS_0 = \$1.20$
 Payout rate = 100%
 $D_0 = \$1.20 (EPS_0 \times 100\%)$
 $r = 14\%$
 $P_0 = D/r$
 $P_0 = 1.20/.14$
 $P_0 = \$8.57$
2. Constant-growth model:
 $EPS_0 = \$1.20$
 Payout rate = 40%
 Retention rate = 60%
 $D_0 = EPS_0 \times 40\% = \$1.20 \times .40 = \$0.48$
 $g = \text{Retention rate} \times ROE = 60\% \times 15\% = 9\%$

$$\begin{aligned}P_0 &= D_1/(r - g) \\&= [D_0(1 + g)]/(r - g) \\&= [0.48(1.09)]/(.14 - .09) \\&= \$10.46\end{aligned}$$

3. Variable-growth model:

$$g_1 = 50\%$$

$$g_2 = 20\%$$

$$g_3 = 20\%$$

$$g_{4 \rightarrow} = 9\%$$

$$EPS_0 = \$1.20$$

$$\text{Payout} = 40\%$$

$$D_0 = \$0.48$$

$$D_1 = D_0 (1+g_1) = 0.48(1.50) = 0.72$$

$$D_2 = D_1 (1+g_2) = 0.72(1.20) = 0.864$$

$$D_3 = D_2 (1+g_3) = 0.864(1.20) = 1.0368$$

$$D_4 = D_3 (1+g_4) = 1.0368(1.09) = 1.1301$$

$$P_0 = \frac{D_1}{(1+r)^1} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \frac{P_3}{(1+r)^3}$$

$$P_3 = \frac{D_4}{r - g} + \frac{1.1301}{.14 - .09} = \$22.602$$

$$\begin{aligned}P_0 &= \frac{0.72}{(1.14)^1} + \frac{0.864}{(1.14)^2} + \frac{1.0368}{(1.14)^3} + \frac{22.602}{(1.14)^3} \\&= 0.632 + 0.665 + 0.70 + 15.256 \\&= \$17.25\end{aligned}$$

4. These differing valuations are driven by the expectations of earnings and dividend growth. As a potential investor you are interested in any information that may provide indications of the company's future growth prospects.