1
An introduction to equity markets

1.1 The benefits of a smooth-running stock exchange

Why is it that stock exchanges are considered so important? Why do most national news bulletins conclude by telling their audience what the local stock exchanges have done that day?

Most developed stock exchanges around the world are considered “liquid”, and shareholders are able to sell their shares quickly, at a fair price and at a low cost. In addition, shareholders know at any given point that they can sell their shares, and even if they don’t wish to sell they know the value of their holdings. Because of this enhanced liquidity and transparency in pricing, shareholders are willing to supply capital to the stock market. In economics we typically solve the “scarcity” problem by allowing the market to decide what will be produced and which firms will produce it. An efficiently functioning stock market, similarly, helps allocate scarce investment capital. If the market was poorly regulated and operationally inefficient, then it is likely that we would face an inefficient allocation of capital.

In order to induce investors to provide capital to the stock market, they need to know that there is a level playing field and that the market is not skewed in the direction of investors with privileged information. If investors do not hold this view, then they will be unwilling to supply capital to the market and this will inhibit economic growth.
When a company makes the decision to go public, there is a recognition that the consequent reporting requirements are much more stringent than when it was privately owned. A privately owned company is required to publish annual reports, but when a company goes public the extent of the information that is required to be made known is increased. In the US, this is referred to as the 10K form. In addition to this, companies are required to submit a 10Q form to the Securities and Exchange Commission (SEC). There are also numerous other forms that may need to be submitted, depending on the firm’s activities. Forms 3, 4 and 13D, for example, are commonly used, as they detail changes in ownership. As a result of this scrutiny, potential suppliers of capital view the firm with enhanced confidence and are more likely to invest.

While the rules and regulations vary around the world, the basic premise of an acquisition is that if one company wants to take over another company, this can be achieved by simply buying the stock in the stock market. The motives for such an acquisition are numerous but include gaining market share or technology and/or the replacement of inefficient management. Stocks that are publicly quoted are exposed to acquisitions, whereas the shares in privately owned companies are not.

1.2 The efficient market hypothesis

In section 5.2 we will cover the net present value (NPV) decision rule and in section 2.6 we will encounter the concept of beta. In an NPV decision rule, it is imperative that any real investment decisions made by a company are reflected in the company’s share price. For example, if a company makes an investment with a positive NPV it should increase shareholder wealth, and the share price should rise accordingly. In determining the discount rate to evaluate projects it is imperative that the stock price and the stock market index accurately reflect relevant information.

The efficient market hypothesis was developed in 1970 by Eugene Fama, who defined three key forms of market efficiency. In the weak form, current market prices reflect all historical information about a company. In the semi-strong form, the information from the weak form is supplemented by current publicly available information about the company. Finally, the strong form requires stock prices to reflect the information included in both the weak and semi-strong forms, as well as privately held information. This is the most stringent form of market efficiency as it includes “insider” information.

One implication of a stock market having semi-strong form efficiency is that if new information relating to a company is released, the market should immediately process this information rationally, determining whether it has a positive or a negative impact on share prices and adjusting market prices accordingly. The speed of information incorporation is assumed to be so fast that there is no opportunity to buy the shares between information release and
incorporation into the price. This ensures that the market is a level playing field. Information is assumed to arrive randomly and is therefore not forecastable.

Eugene Fama received the Nobel Prize for Economics in 2013. A discussion of his contribution can be found on the Nobel Prize website.¹

1.3 Ordinary shares

Ordinary shares, often known as common stock, are the most common form of financial ownership. When a company issues ordinary shares it is never required to repay the share capital. Ordinary shares normally entitle you to vote and to receive the company’s residual profit, i.e. net profit available after creditors and other providers of capital have been paid. This places ordinary shareholders in a risky situation because they stand at the back of a large queue behind the tax authorities, creditors and preference shareholders (covered later in this chapter). However, the returns to creditors such as bondholders and banks, and to preference shareholders, are fixed, whereas the returns to ordinary shareholders are potentially unlimited.

If you asked a group of students who have not previously studied finance whether a firm that has issued ordinary shares “must pay a regular dividend”, the majority would say yes. However, for ordinary shares there is no guaranteed dividend, and shareholders will only receive a dividend if sufficient funds remain after other creditors have been paid and if the company chooses to pay one. The company could choose to retain the funds and use them for investment purposes.

Activity 1.1

Search online for the following term: “Alphabet certificate of incorporation”. Use the resultant document to determine the difference between A shares, B shares and C shares.

Several companies have different classes of ordinary shares. One well-known company with such a structure is Berkshire Hathaway:

Each Class A common share is entitled to one vote per share. Class B common stock possesses dividend and distribution rights equal to one-

fifteen-hundredth (1/1,500) of such rights of Class A common stock. Each Class B common share possesses voting rights equivalent to one-ten-thousandth (1/10,000) of the voting rights of a Class A share.²

If the A shares are worth US$280,850 and the B shares are worth US$187.37, then the ratio of one to other is 1498.91, which is very close to the ratio of dividend and distribution rights (1500:1).

1.4 Preference shares

In section 1.3 we discussed ordinary shares, which are the most popular form of shares. However, another form of share capital exists in the form of preference shares. As the name suggests, preference shares are preferred to ordinary shares when it comes to the distribution of profits in the form of dividends. In addition, if a company faces financial difficulties, preference shareholders are given priority in the distribution of assets. Moreover, while the payment and size of dividends on ordinary shares are discretionary, preference shares “guarantee” a fixed dividend. However, if a firm fails to pay a preference dividend then the company will not face bankruptcy, which would be the case if a company failed to make a bond/loan payment. As the dividend is “guaranteed”, from an investor’s perspective it is considered a low-risk investment compared to ordinary shares, and it follows that investors will accept a lower return than from ordinary shares in the same company. In addition, preference shares usually do not have voting rights attached to them.

Examples of preference dividends

The Bank of China issued RMB 39.94 billion of preference shares in October 2014 with a nominal value per share of RMB 1,000 and a dividend rate of 6.75%.³

British Petroleum has two preference shares in issue. The payment details are as follows:

Payment of the dividend for the 8% and 9% cumulative preference shareholders is made on:

- 31 January (or the closest working day) for the half year ended 30 September; and
- 31 July (or the closest working day) for the half year ended 31 March.

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The dividend will be £0.04 (4p) per share for 8% cumulative preference shareholders and £0.045 (4.5p) per share for 9% cumulative preference shareholders.4

Preference shares have very similar characteristics to loan capital from the issuer’s point of view, with the requirement to pay a fixed dividend each year. However, there are two distinct differences between loan capital and preference shares. Loan capital has a finite life, whereas preference shares have an infinite life. In addition, preference shareholders are considered as having ownership in the company, whereas lenders are not. As a result, interest payments can be considered as a legitimate business expense and hence deducted before taxation.

Consider two companies, A and B, which are looking to raise £100m in external financing. Company A has raised the £100m via a preference share issue with a yield of 10% p.a. Company B has issued a perpetual bond with an annual coupon payment of 10% p.a.

Is there a difference in the amount of wealth available for distribution to ordinary shareholders if they both generate profits before tax, dividends and interest of £80m?

| Tax rate | 26% |
| Debt issue | £0.00 | £100,000,000 |
| Preference share Issue | £100,000,000 | £0.00 |
| Debt yield (%) | 10% |
| Preference share dividend (%) | 10% |

<table>
<thead>
<tr>
<th>Company</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profits before tax, dividends and interest (1)</td>
<td>£80,000,000</td>
<td>£80,000,000</td>
</tr>
<tr>
<td>Interest payable on bonds (2)</td>
<td>£0.00</td>
<td>£10,000,000</td>
</tr>
<tr>
<td>Taxable profit (3) = (1) – (2)</td>
<td>£80,000,000</td>
<td>£70,000,000</td>
</tr>
<tr>
<td>Tax payable (4)</td>
<td>£20,800,000</td>
<td>£18,200,000</td>
</tr>
<tr>
<td>Preference dividend (5)</td>
<td>£10,000,000</td>
<td>£0.00</td>
</tr>
<tr>
<td>Available to ordinary shareholders (3) – (4) – (5)</td>
<td>£49,200,000</td>
<td>£51,800,000</td>
</tr>
<tr>
<td>Difference</td>
<td>£2,600,000</td>
<td></td>
</tr>
<tr>
<td>Tax rate x debt issue x debt yield</td>
<td>£2,600,000</td>
<td></td>
</tr>
</tbody>
</table>

It is evident that the tax paid by Company A is lower than that paid by Company B, because interest paid on Company B’s debt reduces the taxable profit. This results in an extra £2.6m being available for distribution to ordinary shareholders. This difference is referred to as the tax shield and can be found by: debt issue x tax rate x debt yield

The spreadsheet for this exercise can be found here. Please ensure you click on Section 1 and the 1.4 tab at the bottom of the spreadsheet.

1.5 Authorised, issued and par values

When a firm is incorporated, an amount referred to as the authorised share capital is determined. This indicates the maximum number of shares the company can issue. In the majority of cases, companies do not issue up to this amount. For example, a company may have set its authorised share capital at £200m but may only have issued £150m as shares, leaving £50m as authorised but unissued share capital. The company is then free to issue the remainder as it wishes to raise additional capital.

Ordinary shares have what is referred to as a “par value”, which is usually an amount such as 100 pence or 50 pence. This bears no relation to the current market value of the shares. However, in the balance sheet of a company, the issued share capital appears as par value. The balance sheet also includes an amount referred to as the “share premium account”, which reflects the difference between the amount paid for the shares at the time of issue and the par value.
Example

The equity component of the balance sheet in Speedy Hire’s 2017 annual statement\(^5\) includes the following details:

<table>
<thead>
<tr>
<th>Equity</th>
<th>2017 (£m)</th>
<th>2016 (£m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share capital</td>
<td>26.2</td>
<td>26.1</td>
</tr>
<tr>
<td>Share premium</td>
<td>191.4</td>
<td>191.4</td>
</tr>
<tr>
<td>Merger reserve</td>
<td>1.0</td>
<td>1</td>
</tr>
<tr>
<td>Hedging reserve</td>
<td>(0.6)</td>
<td>(0.9)</td>
</tr>
<tr>
<td>Translation reserve</td>
<td>0.6</td>
<td>(1.8)</td>
</tr>
<tr>
<td>Retained earning</td>
<td>(29.0)</td>
<td>(37.5)</td>
</tr>
<tr>
<td><strong>Total equity</strong></td>
<td><strong>189.6</strong></td>
<td><strong>178.4</strong></td>
</tr>
</tbody>
</table>

Here you will notice that the share premium account remained constant at £191.4m, but the share capital account increased from £26.1m to £26.2m. The notes to the accounts state: “During the year, 0.3m ordinary shares of 5 pence were issued on exercise of options under the Speedy Hire Sharesave Schemes”.\(^6\) In addition it details that the £26.2m is made up of 523.6m ordinary shares of 5 pence each = £26,180,000

1.6 An initial public offering

An initial public offering, more commonly known as an IPO, is when a privately owned company issues stock to the wider public for the first time. By way of an example, consider the case of Facebook, which was incorporated in 2004 with equity stakes divided between the co-founders Mark Zuckerberg and Eduardo Saverin. Later in 2004, a venture capitalist, Peter Thiel, invested US$0.5m in return for a 10.2% share of the company. There then followed two further rounds of funding, referred to in the media as series A and B, when shares were sold to various venture capitalists. A third round of funding (series C) in 2007 saw 1.6% of Facebook sold to Microsoft for US$240m, implying that the value of the entire Facebook company was US$15Bn. In May 2012, Facebook held an IPO when it sold an approximate 15% stake amounting to 421

\(^5\) https://www.speedyservices.com/investors/results-reports
million shares, priced at US$38 per share, giving the company an overall valuation of US$104bn and realising significant gains for the initial founders and investors.

The share performance following the IPO was initially disappointing and investors in the IPO would have suffered a loss, albeit a “paper” one. But those investors who held on to the shares for five years would have experienced gains in excess of 350%. Note, had the number of shares in issue remained static, aside from personal gains by managers and founders, Facebook, as a company, would not have benefited. However, Facebook has issued shares since the IPO at an ever higher share price, which has benefited the company tremendously.

Facebook is a classic example of a small, young company seeking both capital to expand and also a return on investment for both founders and investors. An UK example is the supermarket chain Morrisons, which started as a market stall in Bradford in 1899 and held an IPO in 1967, and now has about 500 UK supermarkets. IPOs can also be made by large privately owned companies. For example, in 1999 the previously privately owned company Goldman Sachs held an IPO, selling 12.6% of the company to the public at US$53 per share. Of the remainder, 48.3% of the company was held by 221 former partners, each holding approximately US$63m.

In an IPO the money paid by investors for the newly issued shares goes directly to the company, in what we will refer to as the primary market. Subsequent trading takes place in the secondary market, and any gains or losses are therefore independent of the issuing company and simply pass between investors.

Following an IPO, the company’s founders and initial investors will see the size of their shareholdings fall as more shares are issued. However, if the capital is used wisely, the shareholders will see a rise in the absolute value of their shares. In the case of Goldman Sachs, the share price had risen to around US$230 per share at the start of 2017 from US$53 in 1999.

### 1.7 Stock market indices

A stock market index is a method of measuring a stock market as a whole. Stock market indices are classified in four key ways:

1. **Global stock market indices** gauge the performance of the world’s equity markets. For example, the Financial Times All-World Index measures the performance of large and mid-cap stocks from 47 countries.

2. **Regional stock market indices** measure the performance of regional equity markets. For example, the Euro Stoxx 50 consists of the 50 largest, and most liquid, stocks in the Eurozone (i.e. countries having the euro as their currency).

3. **National stock market indices** represent the performance of the entire domestic stock market of a country. This is particularly useful since most economic indicators, such as
Gross Domestic Product, are published on a quarterly basis, whereas stock index prices are available on a second-by-second basis and therefore provide an immediate barometer of economic activity. Each country has its own important stock market index. In the UK, the leading stock market index is the FTSE100, which includes the 100 largest UK companies. In addition, it represents approximately 80% of the capitalisation of the entire UK stock market.

4. Focused indices track specific sectors of the economy or specific types of shares. For example, the S&P Global Luxury index represents the performance of 80 stocks engaged in “luxury” activities. Notable inclusions are LVMH-Moet Vuitton, Tesla and Daimler.

**Activity 1.2**

Search online for the following term: “FTSE250 chart”. Note the value of the index on 23 June 2016 and 24 June 2016.

### 1.8 Stock market linkages

As noted above, a stock market index can be considered a barometer of economic activity. In addition, as world economies are exposed to many of the same systematic issues, they have a tendency to move together. Consider the following scatter diagram:
It is evident that the two stock market indices have a tendency to move together. In fact, over the 261 weeks analysed, the two series moved in the same direction for 196 weeks (75%) and in the opposite direction for 65 weeks (25%). A more formal way of communicating this information is to say that the correlation between the weekly returns is 0.73 and is therefore positive. Correlation takes on the following values:

- Correlation = –1: two series are said to be perfectly negatively correlated.
- Correlation = +1: two series are said to be perfectly positively correlated.
- Correlation = 0: two series exhibit no discernible relationship.

We could say therefore that FTSE100 and S&P500 weekly returns are strongly positively correlated.

The spreadsheet for this exercise can be found here. Please ensure you click on Section 1 and the 1.8a tab at the bottom of the spreadsheet.

Consider the following correlation matrix, calculated using five years of weekly returns data for a range of stock market indices.
AN INTRODUCTION TO EQUITY MARKETS

FTSE100 – FTSE 100 index (UK); S&PCOMP – Standard and Poors 500 Index (US); CHSASHR – Shanghai A share index (China); ASX200I – Australian Stock Exchange Index; DAXINDX – DAX 30 Index (Germany); JSEOVER – Johannesburg Stock Index (South Africa).

The most strongly correlated indices over this period are the DAX in Germany and the FTSE100 in the UK. The most weakly correlated indices over this period are the Shanghai A share index and the Australian Stock Exchange index. Note that all of the calculated correlations are positive.

The spreadsheet for this exercise can be found here. Please ensure you click on Section 1 and the 1.8b tab at the bottom of the spreadsheet.

1.9 Rights issues

Once a company has a listing on the stock exchange it can raise additional capital via a rights issue. In a rights issue, existing shareholders are offered the opportunity to buy additional shares at a price that is usually a discount from the prevailing market price. There is no requirement for existing shareholders to accept the offer and they are permitted to sell the rights on. A rights issue usually takes place on a ratio basis. For example, in 2015 Tata Motors raised new capital via a rights issue that offered six new shares for every 109 shares held. This would be a 6-for-109 rights issue.

If you buy shares in a company that is undertaking a rights issue then two important terms are used: cum-rights and ex-rights. Shares that are labelled as cum-rights provide the opportunity to take part in the rights issue, whereas shares that are labelled ex-rights do not. In the latter case, the opportunity to take part in the rights issue resides with the previous shareholder.
Example

Consider a company, Riverbank plc, that wishes to raise capital for investment yet is reluctant to borrow the money in the capital markets. Instead it seeks to raise money via a rights issue. In order to attract investors, it will need to offer existing shareholders the opportunity to buy new shares below the current market price. This is not only attractive to investors but avoids the risk of the share price falling between the beginning and the completion of the rights issue.

Riverbank has decided it will raise £50m by issuing 25m shares at a price of 225p each. As Riverbank plc presently has 100m shares in issue, the rights issue will be a 1-for-4 rights issue, i.e. the ratio of 25m new shares to 100m old shares. The pre-rights issue share price is 250p.

Clearly the share price cannot remain at 250p following the rights issue. In order to determine the ex-rights share price, we can consider the total capitalisation of the company:

- Total capitalisation pre rights issue = £250m
- Capital raised = £56.25m
- Total market capitalisation = £306.25m
- Total shares available = 125m
- Ex-rights share price = 245p

Alternatively, you can examine the situation from the viewpoint of an investor holding four existing shares who participates in the rights issue:

- Four existing shares at a price of 250p = 1000p
- One new share for cash at 225p = 225p
- Total value of five shares = 1225p
- Value of one share (ex-rights) = 245p

A common misconception is that, because the share price has fallen, the investor must lose out. Our investor holding four shares, who took up the rights issue, has lost 5 pence for each share, a loss of 20p in total. However, they purchased one new share for 225p via the rights issue, which is now worth 245p. Therefore, the shareholder experiences a decline in the price of the old shares, but this loss is exactly offset by the gain in share value on the new rights issue shares. The gain/loss can also be considered as the value of a right on one share, which in this example is:

\[
\frac{\text{Market value of shares ex-rights} - \text{subscription price}}{\text{Number of shares required to purchase one new share}}
\]
plugging in the data:

\[
\frac{245 - 225}{4} = 5p
\]

Hence the value of a right for someone holding four shares is 20p.

### 1.10 Stock splits

The nominal book value of a company’s shares is defined as:

\[
\text{number of shares in issue} \times \text{nominal value of each share}
\]

In a stock split, the nominal value of each share is reduced while at the same time there is a proportional increase in the number of outstanding shares. The net effect is that the nominal book value remains unchanged. For example, a company may have 10m shares in issue with a nominal value of 50p each (nominal book value = 10m x 50p = £5m). In order to achieve a stock split, the firm issues a further 10m shares to existing shareholders with the nominal value of each share reducing to 25p each. The nominal book value is now 20m x 25p = £5m. The motivation for doing this is often counter-intuitive to students, as clearly the share price will fall. However, as the post-stock-split share price is reduced, the stock becomes more attractive to investors. In fact, in 2014, Google (now Alphabet) undertook a 2-for-1 stock split following the rise in the share price to above US$1,000 per share. This higher share price was considered unattractive to individual investors.

Apple has held numerous stock splits since 1987 as detailed below:

<table>
<thead>
<tr>
<th>Date</th>
<th>Stock split</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 2014</td>
<td>7-for-1 stock split</td>
</tr>
<tr>
<td>February 2005</td>
<td>2-for-1 stock split</td>
</tr>
<tr>
<td>June 2000</td>
<td>2-for-1 stock split</td>
</tr>
<tr>
<td>June 1987</td>
<td>2-for-1 stock split</td>
</tr>
</tbody>
</table>

In June 1987, 1 original share became 2 shares, which in June 2000 became 4 shares, which in February 2005 became 8 shares; finally, in June 2014, these 8 shares became 56 shares. Therefore if, in 2017, the Apple share price is around US$150 per share, this actually represents 56 x US$150 of the original share’s US$8,400. The original IPO price in 1980 was around US$22!

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7 http://investor.apple.com/dividends.cfm
Activity 1.3

Search online for the following terms: “Microsoft stock split history” and “Microsoft stock price”. Obtain the current market price for Microsoft and compare this to the original IPO price of around US$21.

A reverse stock split is less common but not unknown when the company wishes to increase the share price. In a reverse stock split, the number of outstanding shares is reduced and the share price increases proportionately. For example, if you own 10,000 shares in a company and it declares a 1-for-10 reverse split, you will own a total of 1,000 shares after the split, albeit at a higher price. Therefore, a reverse stock split has no effect on the overall value of what shareholders own. In May 2011, Citigroup held a 1-for-10 reverse split. The impact of the stock split is shown in the table below:

<table>
<thead>
<tr>
<th>Date</th>
<th>Open</th>
<th>High</th>
<th>Low</th>
<th>Close</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/05/2011</td>
<td>4.49</td>
<td>4.51</td>
<td>4.46</td>
<td>4.48</td>
<td>27190000</td>
</tr>
<tr>
<td>06/05/2011</td>
<td>4.55</td>
<td>4.58</td>
<td>4.5</td>
<td>4.52</td>
<td>5131700</td>
</tr>
<tr>
<td>09/05/2011</td>
<td>44.89</td>
<td>45.12</td>
<td>43.85</td>
<td>44.16</td>
<td>49168100</td>
</tr>
<tr>
<td>10/05/2011</td>
<td>44.01</td>
<td>44.53</td>
<td>43.75</td>
<td>44.2</td>
<td>42299000</td>
</tr>
</tbody>
</table>

You can see that the reverse stock split had the desired effect in boosting the lowly share price from around US$4.5 to over US$44.

1.11 Share repurchase

A share repurchase (or buy-back) is similar to a dividend in that a company is distributing wealth to shareholders. Under a share buy-back a company repurchases its shares at the prevailing market value (or at a premium), thereby reducing the number of shares outstanding. The rationale for this is that the management may feel that the stock price is too low and that buying its own shares may give a positive signal to the market. Alternatively, it may be viewed as a way of returning wealth to shareholders. For example, during 2010, 2011 and 2012, AstraZeneca repurchased shares amounting to US$2,604m, US$6,015m and US$2,635 respectively. One of the best-known long-term share repurchase schemes is that of Home Depot, which,

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since 2002, has repurchased stock having a value of approximately US$67.1 billion, as it returns wealth to shareholders. We will see in later sections that the value of an asset or a company is found by discounting future cash flows at a discount rate that represents the risk of future operations. A share repurchase does not change the risk of the future cash flows, but it does change two notable financial ratios: return on assets and earnings per share.

The example below demonstrates this case.

**Example**

Suppose a company repurchases two million shares at £5 per share for a total cash outlay of £10m.

If before the repurchase it had £40m cash, total assets of £70m, earnings of £5m and 20m outstanding shares, what would be the impact of the repurchase on the return on assets (ROA) and earnings per share (EPS)?

<table>
<thead>
<tr>
<th></th>
<th>Before repurchase</th>
<th>Post-repurchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash (1)</td>
<td>£40,000,000</td>
<td>£30,000,000</td>
</tr>
<tr>
<td>Assets (2)</td>
<td>£70,000,000</td>
<td>£60,000,000</td>
</tr>
<tr>
<td>Earnings (3)</td>
<td>£5,000,000</td>
<td>£5,000,000</td>
</tr>
<tr>
<td>Shares outstanding (4)</td>
<td>20m</td>
<td>18m</td>
</tr>
<tr>
<td>Return on assets (5) = (3)/(2)</td>
<td>7.14%</td>
<td>8.33%</td>
</tr>
<tr>
<td>Earnings per share = (3)/(4)</td>
<td>0.25</td>
<td>0.28</td>
</tr>
</tbody>
</table>

The company’s cash has been reduced from £40m to £30m, which in turn lowers the total assets of the company from £70m to £60m. This then leads to an increase in its ROA, even though earnings have not changed. A similar effect can be seen in the EPS number, which increases from 0.25 to 0.28. The buy-back also helps to improve the company’s price–earnings ratio (P/E), since if we assume that the shares remain at £5, the P/E ratio before the buy-back is 20 (£5/0.25). After the buy-back, the P/E decreases to 18 (£5/£0.28) due to the reduction in outstanding shares. From an investor’s perspective, a lower P/E ratio is preferable as you are paying less of a multiple of a company’s earnings.

The spreadsheet for this exercise can be found [here](#). Please ensure you click on Section 1 and the 1.11 tab at the bottom of the spreadsheet.