3

THE GREAT EMRP DEBATE

The Equity Market Risk Premium (EMRP) is a simple concept. It represents the additional expected return investors require to invest funds into equities rather than risk-free instruments. However, quantification of the EMRP is highly dependent on the measurement approach adopted and, as a consequence, it is one of the most controversial subjects in financial literature.

There are two basic techniques: the historic approach and the forward-looking approach. Proponents of each camp will argue their case but, in reality, neither is demonstrably correct and the issue remains an unresolved debate of considerable practical importance.

Introduction

Chapter 2, 'CAPM @ work,' dealt with the risk-free rate and beta, but did not deal with the third and most contentious component in determining the cost of equity – the Equity Market Risk Premium (EMRP). This is probably the most significant number in cost of capital analysis. Views on the likely magnitude of this variable determine asset allocation strategies and corporate acquisitions, and can even influence public sector policy through capital budgeting techniques.

EMRP is probably the most significant number in cost of capital analysis.

What is this fundamental concept? It is the additional *expected* return that an investor demands for putting his or her money into equities of average risk, rather than a risk-free instrument. It can be expressed mathematically as:

$$EMRP = (R_m - R_f)$$

where R_m = the expected return on a fully diversified (market) portfolio of securities

R_f = the expected return on a risk-free security, proxied by the return on a government bond (as we have seen in Chapter 2).

There are two approaches that can be used to determine the level of the EMRP. They are:

- the historic (or ex-post) approach
- the forward-looking (or ex-ante) approach.

We examine the advantages and drawbacks of both techniques, provide a guide to their strengths and weaknesses and give a flavor of the results obtained.[1]

The historic approach

The most documented and frequently discussed approach to determining the magnitude of the EMRP is to use historic information to calculate the additional returns that equities have *actually* achieved over a number of years in the past. This is of interest in considering the EMRP, because what was actually achieved in the past should, in principle, reflect the additional returns required.

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To understand why this is the case, recall the material on arbitrage in Chapter 1. If actual achieved returns were above those required, one would have expected equity investors to be attracted to invest more money in equities, driving up share prices, and reducing returns. Similarly, lower than required returns would lead to less equity investment, driving share prices down and returns up. Arbitrage should ensure that – in well functioning capital markets – required and achieved returns should be equivalent.

Consequently, the key issue in examining the historic achieved EMRP as a guide to what EMRP investors expect when they invest in equities today is whether the past provides a good indicator of how the market will behave in the future. In part, this depends on whether investor expectations are influenced by the historic performance of the market. It also depends on whether market conditions and investor expectations going forward differ to those observed historically.

Arithmetic versus geometric means

Historic returns achieved by a diversified market portfolio of equities (R_m in the EMRP formula above) are best proxied by the returns achieved from the stock market itself. Historic returns on government bonds (as a proxy for the risk-free rate) can then be subtracted to give an estimate of the historic EMRP.

Arithmetic means suggest higher historic EMRPs than geometric means.

But how should these historic returns be calculated? This is an important issue, because it is possible to measure returns using either an arithmetic mean or a geometric mean. The resulting EMRP will differ depending on the type of mean that is adopted.

Arithmetic means suggest higher historic EMRPs than geometric means. This is because an arithmetic mean simply averages the individual annual returns

over the period being considered, whereas a geometric mean calculates the annual compound growth in returns over the period. Example 3.1 illustrates the distinction between the arithmetic mean and the geometric mean.

Example 3.1 Two ways of measuring returns

Consider an investor who starts out with $1, and invests this dollar in the stock market. At the end of the year, suppose the market has risen by 20%, meaning that the dollar is now worth $1.20. In the following year, the investment is subsequently left in the stock market, which falls by 12.5%. The $1.20 is now only worth $1.05. What is the average return?

Arithmetically, the return is $(20\% + -12.5\%)/2 = \underline{\underline{3.75\%}}$

Geometrically, the return is $\underline{\underline{2.5\%}}$ (the geometric mean of the return for the two-year period, which is calculated by taking the square root of the ratio of the final value, $1.05, to the starting value, $1.00).

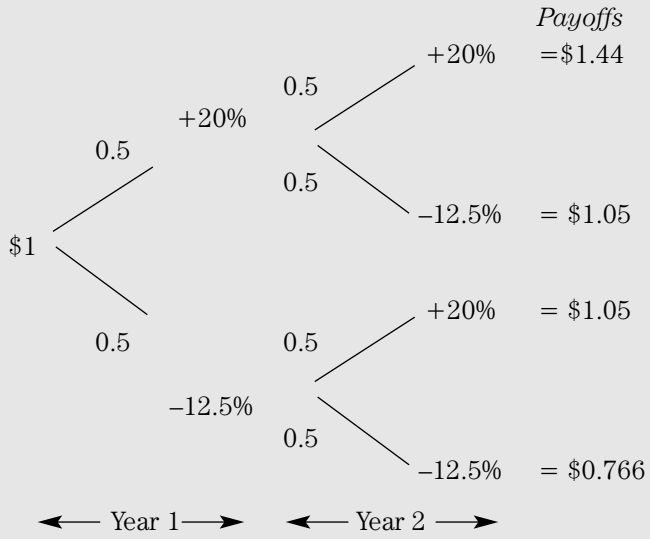
$$\sqrt{1.05} - 1 = \underline{\underline{2.5\%}}$$

From the point of view of calculating returns actually achieved by investors historically, which is likely to be the more appropriate measure? The geometric mean for a period gives a measure of the average annual return achieved by an investor who held equities for the whole period. The arithmetic mean provides a measure of the average returns earned by investors holding equities for sub-periods within the period being considered. So the geometric average arguably provides the best guide on actual returns achieved in the past if one believes it is realistic to look at returns for any period being considered (a two-year period in Example 3.1) on the basis that investors could be assumed to have engaged in a buy and hold strategy during that period. This seems somewhat unrealistic. For example, in calculating equity returns for a 70-year data set this implies a holding period of 70 years. If, however, one believes it is more realistic to look at average returns on the basis that within any period different investors will have moved into and out of equities over time, then the arithmetic mean may have more relevance.

This point is illustrated further in Example 3.2.

Example 3.2 Arithmetic versus geometric means revisited

Consider the same investor with $1. Let us assume that there is an equal probability of the stock market rising by 20% each year as there is of its falling by 12.5% (the outcomes highlighted in the earlier example). Over two years, this situation can be modeled using probability analysis as follows:



What is the expected return from making the $1 investment? It is:

$$(\$1.44 + \$1.05 + \$1.05 + \$0.766) / 4 = \$1.0765$$

This equates to a compound (geometric average) return of 3.75% each year.

$$\sqrt{1.0765} - 1 = \underline{\underline{3.75\%}}$$

This is the *arithmetic* mean of the returns as calculated in Example 3.1.

This analysis shows that taking the arithmetic mean is equivalent to taking each annual outcome actually observed in the period being examined, assigning an equal probability to each, and calculating the expected outcome on the basis of all the possible permutations of these outcomes. The arithmetic mean is then the average compound (geometric) return for this expected outcome.

This demonstrates that the arithmetic mean effectively assumes that, when considering a historic period, each of the individual annual returns observed in that period gives an equally valid insight into the range of possible variation in returns to which an equity investor was exposed.

On a related point, it is also possible to argue that even if investors do not move into and out of equities over time, investors are actually making subconscious investment decisions to hold onto their portfolio of shares in the market every instant of every day. They may therefore be concerned by short-term share price volatility, and consider this to be the relevant measure of risk.

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This is known as 'investment myopia,' and is sometimes used to justify a preference for the arithmetic mean rather than the geometric. In this context, holding periods may be a misleading guide to the manner in which equity investors take decisions.

So, which estimate should you use? The choice between geometric and arithmetic means would appear to depend on subjective views that are formed in respect of how investors behave, the psychology underlying how they assess risk and also the behaviour of the stock market. Practitioners should not expect an early resolution to this debate.

Historic estimates of the EMRP – the evidence

The historic EMRP also depends on the number of past years over which it has been calculated. This can result in considerable variation in the absolute level of the EMRP itself, as can be seen from Table 3.1, which shows equity, bond, and bill returns data for the UK based on work by Barclays Capital (formerly known as BZW).

The implicit EMRP in Table 3.1 varies from 4.6% (on a bond basis using a geometric calculation technique between 1963 and 1996) to 8.4% (on a bill basis using an arithmetic calculation technique between 1919 and 1996).

Long-term stock and bond prices are usually only available in countries with substantial track records of equity and bond ownership. In practice, this has meant that the historic approach has – for many years – been largely confined to the US and UK markets, although a recent study by Dimson, Marsh, and Staunton[1] has widened the geographic catchment area to include countries such as Denmark, Italy, and Australia. This work is summarized in Figure 3.1.

That the results vary between geometric and arithmetic calculation techniques is unsurprising but, interestingly, there is also significant variation between countries, despite the fact that the period over which the EMRP is measured in

TABLE 3.1
UK stocks, bonds, and bills

	1919–96	1946–96	1963–96
Arithmetic average returns			
Equities	10.1	9.1	9.4
Bonds	3.0	0.9	2.7
Treasury bills	1.7	0.9	1.8
Ex-post EMRP			
Relative to bonds	7.1	8.2	6.7
Relative to bills	8.4	8.2	7.6
Geometric average returns			
Equities	7.8	6.7	6.5
Bonds	2.1	0.2	1.9
Treasury bills	1.5	0.8	1.7
Ex-post EMRP			
Relative to bonds	5.7	6.5	4.6
Relative to bills	6.3	5.9	4.8

Sources: Barclays Capital (1997), *The BZW Equity Gilt Study (now Barclays Capital)*; and Jenkinson (1998), *The Equity Risk Premium: Another Look at History*, The Utilities Journal, OXERA

this study is uniformly taken as between 1900 and 2000. It may be the case that there is a degree of capital market segmentation between these countries, and Dimson, Marsh, and Staunton have observed genuine differences in EMRPs.

In the US, data going back to 1926 published by Ibbotson Associates is widely used. Good stock market data is, however, available going back to 1871, with less reliable data available from various sources going back to the end of the eighteenth century. Data for government bonds is also available for these periods.

Table 3.2 presents the realized average annual premia of US stock market returns (relative to the returns on US long-term Treasury securities) for alternative periods through to 1997.

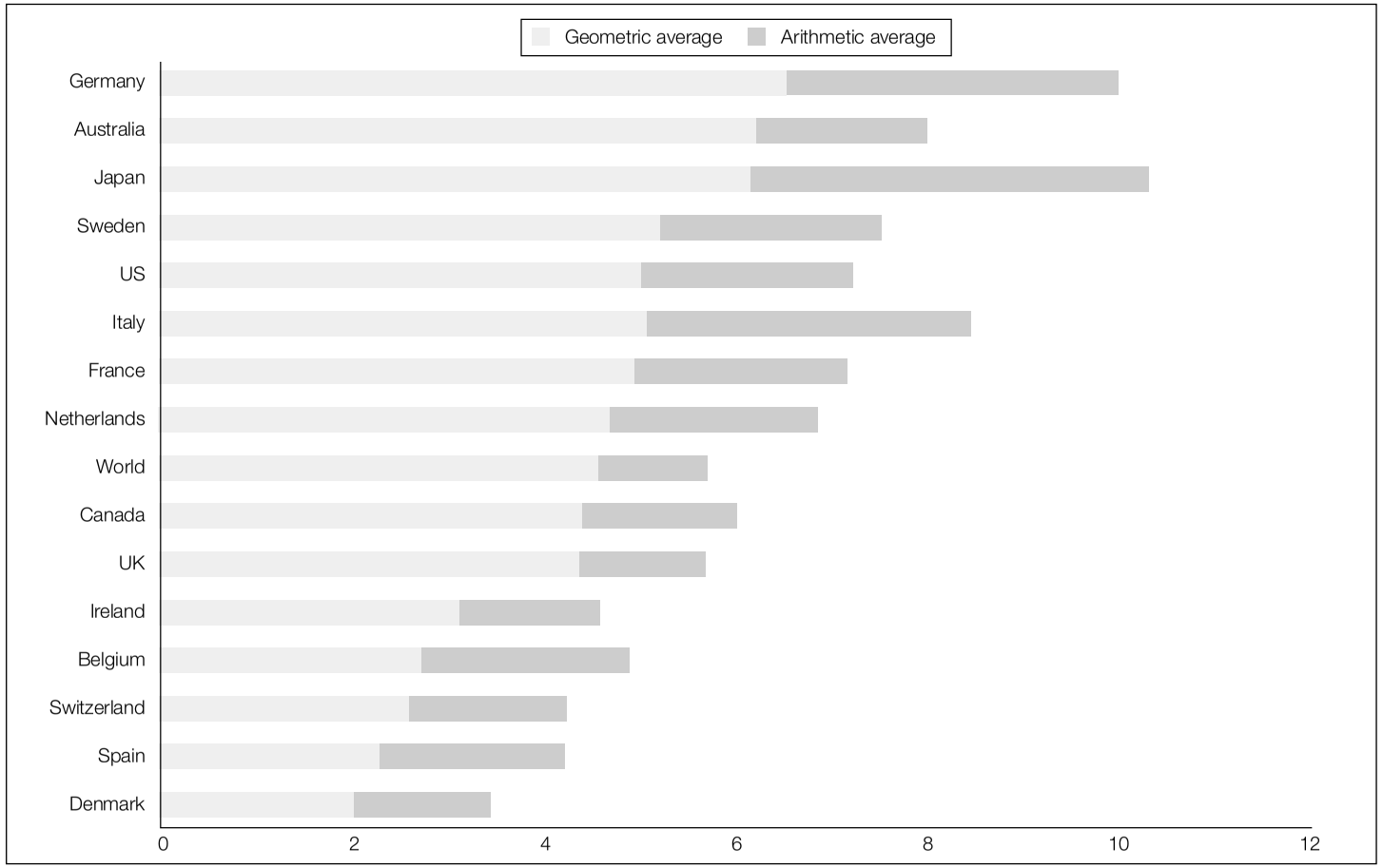
Table 3.2 confirms that historic estimates of the EMRP are clearly sensitive to the period chosen for measuring the average – as well as the choice of average (arithmetic or geometric) used.

Likewise, if one takes the same Ibbotson data and looks at the return in different decades, the figures are even more unstable. This is illustrated in Table 3.3 (arithmetic mean only).

It is interesting to note that if the Ibbotson data is broken into two equal 36-year subperiods – the first covering the period 1926–61, and the second

FIGURE 3.1

Historic equity market premia* in different territories 1900–2000



Source: Dimson, Marsh, and Staunton (2002) *Triumph of the Optimists*

* Measured relative to bonds. Note that the arithmetic average in this figure is illustrated cumulatively, so that the arithmetic average for Germany should be read as around 10% with the geometric average approaching 7%.

TABLE 3.2
US equity premia over time

Period	Arithmetic	Geometric
20 years (since 1978)	8.5%	7.8%
30 years (since 1968)	5.2%	4.0%
40 years (since 1958)	6.3%	5.2%
50 years (since 1948)	8.1%	6.9%
60 years (since 1938)	8.2%	7.0%
72 years (since 1926)	7.8%	5.8%
156 years (since 1872)	6.2%	4.6%
200 years (since 1798)	5.2%	3.8%

Source: Ibbotson Associates and Standard & Poor's

covering 1962–97 – the implicit historic equity premia for the two periods are quite different. Many commentators feel that the EMRP may have fallen in more recent times, and this appears consistent with Table 3.4.

TABLE 3.3
US equity premia by decade (arithmetic)

Period	Percentage (%)
1930s	2.3
1940s	8.0
1950s	17.9
1960s	4.2
1970s	0.3
1980s	7.9
1990s	12.1

Source: Ibbotson Associates

TABLE 3.4
US equity premia in two periods of the twentieth century

	1926–61	1962–97
Equity premia over Treasury bond returns		
Arithmetic average	10.4%	5.2%
Geometric average	7.6%	4.0%

Source: Ibbotson Associates

Explanations are required, and some have been provided. For example, the 1962–97 period was characterized by more stable stock markets and more volatile bond markets compared to the earlier period. This would lead to an increase in fixed income returns and a narrowing of the gap between the expected return on equities and the expected return on bonds.

Separately, it is also true that the 1962–97 period saw a substantial increase in pension fund and other long-term institutional investment in the market. All other things equal, an increase in the supply of capital should lead to a reduction in the EMRP, the price of equity capital.

Other issues in using historic data to calculate the EMRP

Besides the problems associated with identifying the appropriate period of measurement, choosing between the arithmetic and geometric means, and choosing which instruments to use as a proxy for the risk-free rate, there are two additional difficulties associated with the historic approach:

- First, historic data may overstate contemporary expected returns, given opportunities in the modern marketplace for international diversification.
- Second, historic data may be adversely affected by survivor bias.

International diversification

As we shall see later in Chapter 6, 'International WACC and country risk', international diversification reduces the volatility of equity investors' portfolios. In principle, this reduced volatility should lower the required return on the average asset in the portfolio, thereby lowering the expected return on equities generally. This suggests a lower EMRP on a forward-looking basis than is indicated by historic data from periods where opportunities for international investment were more limited.

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Survivor bias

Historic information may also be distorted by survivor bias. That is to say, observed historic returns reflect the returns from those companies that have

continued to trade in their markets – they do not necessarily capture the zero or negative returns associated with those companies that have failed or exited the market.

Investors bear the risk of success and failure, and will form expectations given their assessment of the probability of each. However, without adjustment for survivor bias, measuring achieved premia historically may overstate future expectations. Adjusting for survivor bias is a relatively new development, but it is worth noting that Dimson, Marsh, and Staunton have made some adjustment for it in their recently published work.[2]

Forward-looking approaches

As the name would suggest, forward-looking approaches estimate the EMRP on the basis of market forecasts rather than historic returns. They subtract the risk-free rate from forecasts of returns expected from investing in the stock market.

Forecasts of stock returns can be gathered from a variety of sources, but there are two basic techniques:

- '**Bottom-up**' studies – which forecast rates of return (weighted by market value) for a large number of individual companies.
- '**Top-down**' reviews – which survey aggregate investor expectations about returns from investing in the market as a whole.

Bottom-up models

Bottom-up models typically work by projecting future company dividends, and then calculating the internal rate of return (IRR) that sets the current market capitalization equal to the present value of future expected dividends. A similar procedure can be applied to all companies in aggregate, to obtain a measure of the expected growth rate of the market.

In the US, **Merrill Lynch** (*www.MerrillLynch.com*) publishes 'bottom up' expected returns on the Standard & Poor's 500, derived by averaging expected return estimates for stocks in the Standard & Poor's 500. Merrill uses a multi-stage Dividend Discount Model (DDM) to calculate expected returns for several hundred companies, using projections made by its own securities analysts (see Chapter 4 for more about the DDM). The results are published monthly. Merrill Lynch uses the term 'implied return' to describe the DDM expected return.

A number of consulting firms are reported to be using the Merrill Lynch DDM estimates to develop discount rates, including Merrill Lynch's own investment banking group, and Corporate Performance Systems (CPS) – formerly known as Alcar.

Three potential problems arise when using data from organizations like Merrill Lynch. First, what we really want is investors' expectations, and not those of security analysts. This may not be a real issue, however, as several studies have proved beyond much doubt that investors, on average, form their own expectations on the basis of professional analysts' forecasts. The second problem is that there are many professional forecasters besides Merrill Lynch, and, at any given time, their forecasts of future market returns are generally somewhat different. However, generally these forecasts do not vary substantially. Third, and last, there is some evidence to suggest analysts' forecasts of expected earnings or dividend growth may overstate outturn actual earnings or dividend growth. All other things equal, if there is upward bias in analysts projections used in the bottom-up model then the implicit EMRP that is derived may also be on the high side.

In recent years, the Merrill Lynch expected return estimates have indicated an EMRP in the region of 4% to 5%.

Again, with reference to the US market, it is possible to use **Value Line** projections (*www.valueline.com*) to produce an estimate of expected returns. Value Line analysts routinely make 'high' and 'low' projections of price appreciation over a three- to five-year horizon for over 1,500 companies.

Value Line uses these price projections to calculate estimates of total returns, making adjustments for expected dividend income. The high and low total return estimates are published each week in the *Value Line Investment Survey*, and midpoint total return estimates are published in the *Value/Screen* software database. There is some evidence that Value Line analysts, in common with other analysts, tend to have an upward bias in their estimates of corporate earnings per share: that is, the short-run forecasts tend to be on the high side. Whether this leads to a bias in total return estimates over a three- to five-year horizon is an open question.

The Value Line projected market risk premia are somewhat more volatile than those from the Merrill Lynch DDM model. In recent years they have generally ranged from 2% to 6%.

Top-down approaches

Perhaps the most fundamental 'top-down' approach uses a combination of the dividend yield model and long-term GDP growth rates to estimate expected returns.

The model takes the aggregate current dividend yield of the market and adds to this long-term GDP growth as a proxy for the growth of corporate dividends. The rationale for using GDP growth as a proxy for the growth of dividends is that it is a reasonable assumption that the share of profits in GDP will remain constant in the future. Thus, GDP growth can be seen as a satisfactory proxy for the growth of corporate dividends.

As an example, if the aggregate dividend yield in the market was 3%, and long-term real GDP growth was 2.5%, the model would imply future equity returns of around 5.5% (in real terms). Given a prevailing real risk-free rate of interest of 2%, this would imply an EMRP of 3.5%.

This dividend yield technique is, however, only one of many 'top-down' approaches. Other top-down approaches generally take the form of surveys of the investment community, requesting investors' views of required returns. In recent years, these surveys have become increasingly fashionable and their coverage more prolific, although (unsurprisingly) they are far more commonplace in the US than in other countries.

For example, **Greenwich Associates** (*www.Greenwichassociates.com*) has published the results of an annual survey of pension plan officers regarding expected returns on the Standard & Poor's 500 for a five-year holding period. The Greenwich Associates survey has generally indicated an EMRP in a 2%–3% range. The survey covered a large number of respondents (several hundred), but it was limited to the expectations of pension plan officers.

Separately, one US survey of over one hundred financial economists at leading universities found that – for long-term investments – one quarter of the respondents recommended using an EMRP of 5% or less, another quarter recommended 7.1% or more, and the median recommendation was 6.0%.

Another survey of corporations and financial advisory firms found a variety of practices among the respondents. Corporate respondents commonly reported using EMRP estimates in a 4%–6% range, while financial advisors reported using estimates more often in the 7%–7.8% range (consistent with Ibbotson Associates' 1926–present day arithmetic average).

So, what are we to make of this? Probably the key conclusion is that the answer you get from such a survey depends on the person you ask. Pension fund managers tend to suggest low values for the EMRP. One can speculate that this is because their performance will be judged on the basis of the return they actually secure for their pensioners, and they want to manage expectations down. Personal financial advisors, however, tend to quote high figures. Are we being too cynical if we suggest that this is because they want to attract clients to invest?

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Academics seem to respond with a wide range of different figures – probably because they hold different views on the various theories for calculating the EMRP, and do not necessarily need to justify their views, or take financial decisions dependent on them. Which leaves corporate organizations somewhere in the middle. Their main vested interest in the EMRP seems to be to get it right, so perhaps their views should be given the most weight.

Practitioners' reference books and academic textbooks

A number of authors have expressed their own views on the level of the EMRP in a variety of texts. These include:

- *Graham and Dodd's Security Analysis*, fifth edition (1988), by Sidney Cottle *et al*. The authors use an 'equity risk premium' of 2.75% over the yield on Aaa industrial bonds for valuing the aggregate Standard & Poor's 500 index. This translates into a premium of about 3% over long-term Treasuries.
- *The SBBI Yearbook* series by Ibbotson Associates is generally regarded as an authoritative source of historical US market data for broad asset classes. In addition to supplying data, Ibbotson also makes recommendations on how the data can be used. Ibbotson recommends the arithmetic average since 1926. Measured relative to long-term government bonds this premium is presently 7%.
- *Shannon Pratt's Valuing a Business* is often seen in a valuation practitioner's office. The second edition (1989) suggests that investors might find guidance from historical averages (both arithmetic and geometric) over periods ranging from 20 to 60 years. Also, Pratt mentions the Merrill Lynch and Value Line data, but the book does not make any overall recommendation. The fourth edition, coauthored with Robert Reilly and Robert Schweis (2000), offers the arithmetic average from Ibbotson, suggesting 'this is a widely (but not universally) accepted procedure for estimating the equity risk premium.'

- *McKinsey & Co, Copeland, Koller, and Murrin's Valuation: Measuring and Managing the Value of Companies*, third edition (2000), recommends a premium of 4.5% to 5%, based on a survivor bias adjusted arithmetic average of US data since 1926.
- *James Van Horne's Financial Management and Policy*, eighth edition (1989). The author recommends using 'consensus estimates of security analysts, economists, and others who regularly follow the stock market,' and adds 'the *expected* return on the market portfolio has exceeded the risk-free rate by anywhere from 3 to 7 percent in recent years.'
- *Richard Brealey and Stewart Myers' Principals of Corporate Finance*, seventh edition (2003). The authors use a premium of 8% in quoted examples, favoring use of the arithmetic average relative to government bills.
- *Eugene Brigham and Louis Gapenski, Financial Management: Theory and Practice*, fifth edition (1988). According to the authors 'the risk premium of the average stock cannot be measured with great precision. However, empirical studies suggest that [the market risk premium] has generally ranged from 3 to 6 percent during the last 20 years.' The authors recommend the Merrill Lynch Dividend Discount Model as a good indicator.
- *Jeremy Siegal's Stocks for the Long Run* (1994), has become a widely read text on strategies for long-term investments. Siegal comments that 'as real returns on fixed-income assets have risen in the last decade, the equity premium appears to be returning to the 2 percent to 3 percent norm that existed before the post-war surge.'
- *Aswath Damodaran's Damodaran on Valuation: Security Analyses for Investment and Corporate Finance*, second edition (2002) is a text on security valuation. Damodaran recommends a premium of 5.5%, based on a long run geometric average in the US.
- *Michael Ehrhardt's The Search for Value: Measuring the Company's Cost of Capital* (1994), is a text on rate of return estimation. Ehrhardt recommends a long-run arithmetic average, but recognizes that practitioners also use geometric averages and forward-looking methods.
- *Bradford Cornell's The Equity Risk Premium* (1999), is a text devoted solely to the equity market risk premium. The author quotes the Ibbotson studies, but cautions that in the long run the equity market risk premium is likely to fall to 3.5% to 5.5% over Treasury bonds and 5.0% to 7.0% over Treasury bills.

Some tentative conclusions for developed markets

In our practical work in the field of cost of capital, we have examined a lot of evidence regarding the size of the EMRP in developed markets. We have encountered many different views on this issue from around the world. We have looked at the issue retrospectively, prospectively, top-down, bottom-up, geometrically, arithmetically, internationally, domestically, drunk, and sober. Table 3.5 attempts to characterize the position.

TABLE 3.5
Summary EMRPs

	Historic	Forward-looking
EMRP	4%–8%	2%–6%

While some commentators are prepared to take extreme positions based on the use of one technique versus another, in truth, the great EMRP controversy is still an unresolved debate. It may be necessary to balance the forward-looking approach, which often involves *ad hoc* estimation, against the historic approach, which can be more effectively quantified, but which does not necessarily provide a good guide to the future.

Furthermore, even within the broad range of views that exists, there is room to reconcile the geometric prospective view of the EMRP with the arithmetic retrospective view, as there is common ground around the 4% to 6% mark. Figures within this range may be acceptable to proponents of both the historic and forward-looking techniques. Compromise may be no bad thing.

Key points from the chapter

This chapter has dealt with the equity market risk premium (EMRP). The main conclusions are:

- There are two alternative approaches: the historic approach and forward-looking techniques.
- The historic approach relies on the past being the best indicator of how the market will behave in the future, supported by a belief that investors' expectations are influenced by the historic performance of the market, and

that future market conditions do not differ substantially from those in the past.

- Depending on the time period selected, and whether an arithmetic or a geometric mean is adopted for calculation purposes, the historic approach produces figures in the range of 4% to 8% for the US, with similar or slightly lower results for the UK and other developed markets (according to the most recent research by Dimson, Staunton, and Marsh).
- Forward-looking techniques can be categorized as either bottom-up or top-down and seek to determine the future returns today's investors expect when investing in the market.
- Surveys of expectations can be obtained from firms in the US such as Merrill Lynch, Value Line, and Greenwich Associates. These tend to indicate premia in a range of 2% to 6%, and we would not expect radically different results in other developed markets.

Note

1 This chapter draws on work by Roger Grabowski and David King – see for example David W. King and Roger J. Grabowski (2000) *Equity Risk Premiums* in *The Handbook of Advanced Business Valuation*, McGraw-Hill.

2 Dimson, Marsh, and Staunton (2002) *Triumph of the Optimists*.