Institute of Actuaries of Australia

A discussion of equity premium issues for actuaries

Prepared by the LIWMPC Equity Premium Research Group

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Abstract

This paper outlines the discussions to date of the LIWMPC Equity Premium Research Group. The group has been looking at the equity premium (Equity Risk Premium or ERP) in both the investment world and the actuarial world with a view to determining a succinct framework for discussion, improvement and best practice in this area.

Keywords: Equity premium, discounting, valuing

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1 Introduction

The equity premium is broadly described as the excess return that the equity market provides over a risk-free rate to compensate investors for taking on the risk of the equity market. Its precise meaning differs however depending on the perspective from which it is viewed, by implicit assumptions as to its application in different situations and whether it is time varying or not. It may often be more appropriate to refer to risk premia for different types of equity type risks.

The primary use of the risk premia is for investment portfolio construction. Actuaries also use the risk premia to project the returns on equity type investments, and in the valuation of cash flows under "real world" methods. They are also used in determining the costs of capital and in setting target rates of return for investment projects and setting premium rates.

We note that misunderstanding and abuses of the risk premia are not uncommon:

- in valuation, projections incorporating the equity premium should be discounted at a rate that also includes the ERP in order to avoid distortions (see for instance Day, 2004).
- in investment, assumptions as to the size and nature of the risk premia are critical, and advisors should note that there are significant differences of opinion amongst experts on this matter.

The specific task of estimation and, more generally, understanding the concept of an equity risk premium is difficult - in part due to a wide variety of different and loose approaches to defining, measuring and using the concept of the equity premium. We find that the result is a considerable deal of confusion for practitioners This paper tries to bring together the different approaches with a view to reducing confusion and providing a common basis for future discussion in practical application and research.

The paper starts by considering some of the different definitions and uses of the equity premium (Section 2 and 3) and then considers how it is measured and the different models that are applied (Section 4 and 5). In the conclusion in Section 6 we also discuss further research that the working group would like to undertake.

In Appendix 1 of this paper we have included a literature review that identifies, with a brief synopsis of a large number of papers on this topic.

We welcome suggestions and any interesting references for our future work.

2 Definition and uses of the Equity Premium

We spent some time trying to agree one definition of the ERP for actuaries to use. Our conclusion is that the definition depends on the purpose, context or application.

2.1 Different time perspectives

Fernandez (2009) provides an excellent description of the various definitions of the equity risk premium and the link to usage. He neatly identifies different definitions of equity premium and their sources:

"The equity premium (also called market risk premium, equity risk premium, market premium and risk premium), is one of the most important and discussed, but elusive parameters in finance. Part of the confusion arises from the fact that the term equity premium is used to designate four different concepts:

> 1. Historical equity premium (HEP): historical differential return of the stock market over treasuries.
>
> 2. Expected equity premium (EEP): expected differential return of the stock market over treasuries.
>
> 3. Required equity premium (REP): incremental return of a diversified portfolio (the market) over the risk-free rate required by an investor. It is used for calculating the required return to equity.
>
> 4. Implied equity premium (IEP): the required equity premium that arises from assuming that the market price is correct."

The first of Fernandez's four concepts is clearly historical and the second is forward looking. The third is related to the present and future, but may also be linked to the past as this informs the required level of return. The fourth concept is a combination of expected future cash flows and expectations and current values.

2.2 Themes and controversies

Song (2007) provides a good overview of the research to date on equity premiums and identifies three majors themes in the research:

- the first theme is based on the dividend discount model (DDM) approach where the equity premium is the same as the required cost of capital, and can be measured by the dividend yield plus the dividend growth rate less the risk-free rate (Gordon and Shapiro)
- the second theme assumes a stationary model - that a constant equity premium exists over time – and can be measured from past experience (Ibbotson and Sinquefield),
- the third theme is the equity premium puzzle (Mehra and Prescott), which is that the historic equity premium is too large to be explained with any plausible investor utility functions. He lists various

attempts to explain the puzzle: such as market imperfections, the costs of investing, liquidity preferences and the possibility that historical returns are not representative.

Fitzherbert (2004) created a local controversy by arguing that the equity risk premium is caused by the level of return on shareholder equity relative to interest rates rather than a consequence of the risk averse behaviour of investors. While the returns on shareholder funds obviously drive the return to equity investments, we are happy to make the assumption that company managements and the capital markets are at least partly successful in evaluating the likely risks and returns in investing their limited capital, and that there is a trade-off between expected risk and return.

2.3 Constant or not?

Fitzherbert also asks whether the risk premium is a fixed law of nature or an observed regularity that may change over time. We do not think that anyone can really believe that it is a fixed law of nature given fluctuations in the availability of capital, the profitability and riskiness of available investment opportunities, and the risk aversion of marginal investors – although we the ERP may sometimes be referred to as if it were a law of nature. In section 5.1 we show that the measurement error is so large that we are unlikely ever to have an answer to this question.

Even accepting this, we have found that confusion also arises from implicit assumptions as to whether the equity premium should be modeled as constant or not.

Asher (2007) considers some of the views on the issue of whether it is constant or not, and finds a growing academic consensus that the equity premium is not constant but can include a momentum element and mean reversion elements. The widely used textbook by Campbell et al (1997, 286) says: "It used to be thought that expected asset returns were approximately constant and that movements in prices could be attributed to news about future cash payments to investors. Today the importance of time-variation in expected returns is widely recognized, and this has broad implications for both academics and professionals…"

The time horizon over which the equity premium is to be used is important if one believes the ERP varies over time.

2.4 Other elements of the definition

One key element of the definition is the risk free rate to be used. It is commonly based on government bills and bonds or swap curves, and may be either nominal or real. We also note that the time horizon for the risk free rate needs to be consistent with the purpose of the equity premium.

The equity premium can be taken to be the risk premium that would apply to a diversified portfolio of equities, or to be the return to the market portfolio. It is more likely to refer to the market in one country, but may also refer to the likely return to a global equity portfolio.

The precise meaning may be obvious from the context, but some care needs to be taken to ensure that the term is understood. One of the most important issues with using any estimate of an equity premium in a financial model is that consistency is maintain between the use to which the results of the model are to be

put, the data used to determine the equity premium, and any other assumptions required to be made as input to the model.

Some care also needs to be taken in the use of arithmetic or geometric means. The former may be appropriate for investors benefiting from dollar cost averaging, but the latter is appropriate in other circumstances.

3 Use of Equity Premium

3.1 Introduction

In recent times, the primary use of the equity premium is for investment portfolio construction, often in the context of a system of assets and liabilities where capital is being used to either match liabilities (e.g. defined benefit funds) or to earn the optimal investment return (e.g. investment linked life insurance contracts). The benefit of the additional return is balanced against measures of risk such as the volatility of equity returns and their co-variance with other asset returns.

Actuaries also use the equity premium to estimate discount rates for risky cash flows. A common example is the calculation of the embedded value of life insurance policies under the traditional method. Equity premiums have also been used to determine discount rates for liabilities that are not explicitly linked to markets – sometimes controversially.

3.2 Portfolio construction

Portfolio construction is the process where an investor decides which broad categories of risk to invest in. One approach is to develop a financial model that projects the returns of each main asset class based on expected return, variability and correlation with other asset classes. The risk premia for each class are key parameters in such a financial model.

For the purpose of portfolio construction, the question as to whether the equity premium is constant over time (the stationary concept from Ibbotson and Sinquefield) is critical. If it is, then the portfolio may be constructed with a high degree of confidence once a good estimate of the equity premium is obtained.

If the equity premium is not constant, for example, the intertemporal CAPM from Merton (1973) or the more modern treatment of Cochrane (1999) then the optimal portfolio will also vary over time and the following questions are also important:

- How might the equity premium vary in the future compared to its behaviour in the past?
- What is the starting point for the equity premium – is it higher now than in the past or lower?
- What is the investment horizon for the investor?
- Should investors incorporate current valuation signals into their portfolios?

Generally a stochastic model (analytic or Monte Carlo) is used for portfolio construction purposes. In such a model some of this uncertainty could be represented by assuming a higher assumption for equity variability than one based on past experience.

Note that the level of uncertainty in the future equity premium may lead an investor to place less confidence in a financial model and place more confidence in other methods (such as subjective rules of thumb). In doing so, an Actuary should be cautious and underline the subjectivity of these rules-of-thumb.

3.3 Valuation

An estimate of the equity premium is needed to develop a fair or market valuation model for a block of liabilities or an unlisted portfolio of assets, the future cash flows from which have equity like characteristics.

Where there are "replicating" cash flows for which there are market values, then the fair value can be determined by reference to the values of these cash flows. Charges that are a fixed percentage of an equity portfolio should, for instance, be valued in this way.

There are however many risky cash flows for which it possible to estimate expected values and volatilities, but for which there are no comparable market values. Such cash flows may depend on mortality rates, company expenses or policy lapses. These cash flows need to be discounted at a rate that takes into account their risk. The Capital Asset Pricing model (CAPM) theory provides a basis for valuing these flows that depends on their beta with the market portfolio, which is usually taken to be the local equity market, and the equity premium expected on that market.

CAPM is a model rather than a reality, however, and, in practice, an allowance for a separate illiquidity risk premium may be necessary to more correctly reflect "reality".

Difficulties are also encountered in finding a discount rate for different businesses or cash flows within a company.

We referred in the introduction to the need to ensure consistency in the projection of cash flows and that the discount rate applied. It is particularly dangerous to include any risk premium in cash flows and then discount at a risk free rate. The problem is that an investment strategy with significant equity holdings results in a lower liability value than a conservative strategy with few equity holdings – thus capitalising with certainty a return that is uncertain. Unless holding more equities reduces risk for the entity holding the liabilities, this approach is not consistent with the belief that more risk requires a premium (risk aversion).

It is also sometimes argued that holding equities is a better match for inflation linked pension liabilities than government bonds, and hence that equities therefore are lower risk investments. With the existence of inflation linked government bonds, this argument is more difficult to make. While inflation can be expected to eventually lead to higher share prices, the observed correlation between equity market performance and inflation rates has been negative in the short run for developed countries with low inflation rates (Spyrou, 2004).

Some of the issues discussed above for portfolio construction also apply to valuation questions.

3.4 Stochastic Processes

Actuaries must use stochastic assumptions for valuation of asymmetric risks (as well as for portfolio construction as discussed above). We do not believe that the differences between a risk neutral approach and a "real world" approach are universally appreciated. In particular, it is possible to forget that the implied volatility of the risk neutral method is a computational construct, and has an unknown relationship with expected and realised volatility in the market.

The advantage of a risk neutral approach is that the equity premium need not be estimated. For other purposes such as estimating capital requirements, actuaries do need to take a "real world" approach and make an estimate of the equity premium and likely volatility. They should be conscious of the assumptions required to us implied volatility for the latter.

3.5 Projection of Assets and Liabilities

Actuaries are often involved in a projection of future values of both liabilities and assets for the purposes of decision-making and planning. This often involves a Monte-Carlo simulation where both an equity risk premium and a volatility of equity return are required to best represent what might happen.

A common example of this type of usage and the requirement of risk premia estimates is determining the appropriate level of contributions for a defined benefit superannuation fund, taking into account likely returns on assets.

3.6 Conclusion

Actuaries may need an estimate of risk premia for portfolio construction, asset and liability valuation, and for projection. In all three cases, we would note that the focus is on what will happen to equities and the equity risk premium in the future rather than what has happened in the past. And, as our education drilled into us, the past is not necessarily a good guide to the future.

The core definition we have decided to adopt given the common usage of equity risk premia in actuarial practice is the Expected Equity Return (EER) rather than the other Fernandez categories.

In the next section, we survey various ways to model equity risk premia going forward.

4 Equity Risk Premium Models

This section discusses the alternative models that use the ERP and our understanding of how they are used in practice.

4.1 CAPM

The key results from CAPM are:

- that there are two components to the risk of any asset:

    - a portion related to systemic risk that cannot be diversified away in a portfolio context (this is known as the beta),
    - a portion that is idiosyncratic to the asset and thus can be diversified away (known as alpha), and
- that only the beta of an asset should be rewarded by a premium (the ERP) above the risk-free rate.

CAPM in its naive form assumes perfect rationality, unlimited borrowing and no transactions costs and creates a puzzle as the Historical Equity Premium (HEP) (if it is over 3 or 4%) seems much too large to be rationally explained by risk aversion. A large HEP can be explained by a variety of adaptations to the CAPM, including the impact of lower discount rates over time, limited rationality, borrowing restrictions or significant transaction costs. We probably only need (bounded) rationality and risk aversion to justify the positive equity premium observed over the long run.

The original simple CAPM assumed a constant risk premium and the existence of a single risk factor (beta). Financial economics has moved on from the original CAPM as we discuss below.

There are other questions which we do not consider further. CAPM also assumes that mean and variance are all that you are interested in. However, can we ignore skewness and kurtosis in a model? In addition, is the normal copula appropriate for combining the outcomes from different variables? There are variations of the CAPM that take skewness and kurtosis into account, but we understand that it would be unusual to attempt to incorporate these in practical valuation or portfolio construction. Recently however, Hung (2008) finds that the higher moments provide a better explanation of risk than the size and book-to-market factors.

The simple CAPM model is still used frequently in valuations of equity type liability cash flows, and in portfolio construction.

4.2 Fama/French

Fama and French were early pioneers in empirical investigation as to whether CAPM reflected reality. They found that there may be factors other than beta (systemic risk) that were included in asset risk premia above the risk-free rate. Their three factor model suggested that investors (rationally or otherwise) demand higher expected equity premia (EEP) for small capitalisation and value stocks (high book/market value ratios) in addition to the beta factor.

The small capitalisation effect is often explained by higher volatility (that idiosyncratic risk is actually rewarded or not effectively measured in standard beta estimation methodologies); by the additional costs of researching small stock, and by the higher illiquidity of small-cap equities (e.g. illiquidity is rewarded separately to beta).

Value effect explanations separate into two categories – rational and behavioural. An important rationalist explanation is that value stocks are more highly sensitive to economic downturns and recessions. Given the reality that unemployment is related to recession and that human capital is difficult to hedge, the risk premium for holding value stocks needs to be greater. The behavioural approach (see Chan and Lakonishok, 2002) suggests that there is some permanent investor bias towards growth stocks. This could

be because growth stocks tend to be overpriced because of sell-side hype, or that the marginal investor consistently over-estimates the future growth of earnings.

We are aware of market capitalization being taken into account in the valuation of insurance portfolios, but not of book: market values. In portfolio construction, there are both technical and fundamental investment managers who take both additional factors into account.

4.3 Additional factors

Other factors have been found and are discussed in the literature, often cited as more important than the original Fama French factors of size and value. The momentum factor now has an extensive body of work that is well summarised in Sefton and Scowcroft (2005). A recent exploration of a potential new factor is Clarke, De Silva and Thorley (2010), which finds the presence of a factor which they label volatile minus stable (VMS), which represents idiosyncratic risk that appears to be priced.

These factors and other elements such as liquidity, credit risks and complexity of instrument have both rational and behavioural explanations. Many factors exist and can be considered when applying equity risk premia models, especially where the assets and/or liabilities are skewed away from broad global stock baskets such as the MSCI World.

We are not aware of these other factors being used to adjust the equity risk premium when adjusting rates of discount for valuation purposes, but they appear to be used frequently in portfolio construction.

4.4 Mean reversion

There is also a view (and evidence) that interest rates and the level of the stock market mean reverts to a long-term value range (using book/market, dividend yields or PE ratios). The literature is reviewed in Asher (2007). This reversion can apply to sectors or to the market as a whole, and clearly has an impact on portfolio construction.

Mean reversion may also be considered implicitly or explicitly in valuation.

4.5 Discounted Cash Flow (DCF) models

The Gordon and Shapiro (1956) Dividend Discount Model is an early example of the search for the appropriate discount rate that solves for current price and estimation of cash flow growth.

As the DCF is a widely understood tool for actuaries, we set out below the formulae and decisions needed to be made to arrive at an estimate of the implied equity premium.

Starting with a discounted cash flow framework:

$$\text{Price} = \sum CF_t (1+i)^{-t}$$

i in the formulae above is the ‘discount rate’ that solves the above equation given a known price and given known (or estimated) cash flows. The expected return and the discount rate coincide if:

- there are no priors as to expected changes in future discount rates.
- the discount rate curve is flat. This is a standard assumption for equities (derivation of the Gordon growth model for example) but not for bonds (where the shape of the curve is important).

If we further assume (following the Gordon-Shapiro model) that cash flows are growing at a constant rate (g) then

$$Price_0 = CF_0 * \sum (1+g)^t (1+i)^{-t}$$

For a perpetuity,

$$\sum (1+k)^{-t} = 1/k$$

and for small values of i and g…

$$(1+i)/(1+g) \approx 1+ i - g$$

so …

$$Price_0/CF_0 = 1/(i-g)$$

$$Yield_0 = CF_0/Price_0 = i - g$$

$$i = y_0 + g$$

In words, the expected "buy and hold" for any equity asset is equal to the current yield plus the expected (long-run or trend) growth in cash flows.

The assumptions made to arrive at this basic result, widely used in equity valuation work, provide key indicators of the range of questions that need to be addressed in estimating the IEP:

- Future discount rates are expected to change over time. What is the expected return for an equity allowing for this as a function of the buy and hold discount rate (the i in the above formulae) and the capital gains or losses that result from the discount rate change?
- How would the results vary if a discount rate curve was allowed rather than a constant interest rate assumed?
- Has the growth in cash flows been stable over time, and can it be expected to be stable going forward?

The cash flows in the DCF formulae are implicitly not reinvested, thus the 'growth' assumption for equity earnings should exclude growth from retained earnings. We back these out of the earnings series by assuming they had been reinvested at current returns.

The main decisions for a DCF approach to estimating the IEP are:

- Should the discount rate be nominal or real? If real, then the cash flows should also be expressed in real terms.
- Should dividends or earnings be used as the cash flows? Most academic work concentrates on dividend growth models of equity valuation as dividends are 'objective' and actual cash flows from equity portfolios. In empirical work, earnings are often preferred as the basic cash flow entity for several reasons:
    - there have been large changes to dividend payout policy over a long period of time which skews analysis by implicitly assuming that dividend payout policy will mean revert over time. This may not the case given structural shifts due to investor preferences and tax treatments of dividends versus buy-backs
    - dividend payout policy should be first-order irrelevant following the logic of Modigliani and Miller.
    - a large component of dividend growth is retained earnings so that earnings growth needs to be estimated anyway in establishing appropriate assumptions.
- Should you use operating or reported earnings? The main purpose of the earnings data is to estimate the long-run trend in earnings growth and, in the long-run, earnings growth will invariably include abnormal items.

One of the authors has recently estimated the IEP for US equities using a DCF. Space precludes the full analysis but the main findings were:

- Earnings (per share) cycled around a stable trend, once inflation and earnings retention policy was allowed for. This meant that long-run earnings growth was stationary and forecastable.
- Using long-run trends in real earnings growth, the current "normalised" earnings-per-share level for the S&P500 was 60.0 as at December 2009. With a current price index then of 1115.1, the current yield was thus 4.9% (giving a normalised PE of 19.8).
- The real, non-retained earnings growth (g in the DCF formulae) was -0.2% in the historical data.
- The current discount rate then for equities was estimated to be 4.9% (yield) + 2.5% (future estimate of inflation) + -0.2% (real non-retained earnings growth) equals 7.2%. Given a 10 year bond yield at the time of around 4.0% gives an Implied Equity Premium of 3.2%

It should be noted that the DCF models are based on the assumption that future returns will be related to current dividends or earnings - and are therefore consistent with mean reversion in returns. Empirical data appears to confirm this – see Cochrane, 1999 for instance.

There may well however be more information about the future that can be used to refine the projections. The recent financial crisis has, for instance, seen dividends reduce significantly. That dividends were likely to reduce was signalled in advance not only by the decline in share prices, but also by the large losses reported by some financial companies and by declining commodity prices – and later by company announcements. It would have been entirely inappropriate to use historic dividend or earnings yields after these facts had become known.

4.6 Conclusion

Appendix 1 provides an annotated review of some of what we think to be the more useful equity premium literature – the scope of material is vast and can be daunting. The task of selecting an appropriate model for estimation of equity risk premia is made easier when it is recognised that there are two main categories of model: models that seek to explain what equity risk premia are and why they exist (CAPM and Fama French-like models), and models that seek to estimate what the equity risk premium is currently given information on current price and cash flows expected in the future (Gordon models).

We note again that we use models to interpret the past, but they cannot be used to predict the future without some judgements as to what elements of the past will be carried forward into the future. Blind projection is dangerous.

We are conscious that actuaries may use these models to develop a view as to whether the market is under- or over-valued and to take this view into the assumptions used in estimating the equity premium. We note that there are those who believe that it is inappropriate to second guess the market, and those who believe the market is subject to changes in the sentiment and in the demand and supply of investible funds so that it is subject to bubbles and undue depression (see Asher, 2007 for a short discussion on bubbles and some of the literature). Actuaries need to be conscious of possibly hidden assumptions, and make them clear to potential users of their reports.

DCF models can be particularly useful as they start with current price and implicitly estimate the current implied equity risk premium without requiring an estimate of the equilibrium equity risk premium. CAPM-style models need to consider adding time varying elements such as momentum and mean reversion to make some estimate of how whether markets are deviating from equilibrium.

5 The Historical Equity Risk Premium

Regardless of the model chosen for estimating and thinking about the equity risk premium, the historical data set for the equity return is the only data we have, and understanding the implications of this is important to avoid over-extrapolating the past into the future.

The most important concept in understanding the past is that the Historical Equity Premium (HEP) may be a biased estimate of the Expected Equity Premium (EEP).

5.1 Estimation error and HEP

Most uses of the HEP will be as an estimate of the EEP or the IEP and this estimate will be subject to estimation error. How does this error, and how should this error, affect the decisions made?

The model should be constructed so that the estimation error can be reflected by incorporating a random error term that has a mean of zero and a standard deviation that is based on historical variation. If there is a momentum effect, there will be a positive autocorrelation in the error series so that the mean of the error in the next period depends on the movement in the past unless some allowance is made for momentum elsewhere in the model. Similarly, if there is mean reversion, then the error also has a non-zero mean that

depends on the level of the market (relative to dividends, book value or earnings depending on your measure) – gain unless this is allowed for elsewhere.

Regardless of its nature, practitioners can be tempted to assume that if the HEP is calculated over a long period, the error term can be ignored. However, even over a long period, the effect of the estimation error can be larger than the effect of the statistical error. For instance, if we estimate:

- HEP (using log returns so we can ignore compounding) as 4% p.a.
- Equity volatility as 20% p.a.
- Using 50 years of data and naively assuming independence i.e. standard deviation of the 50 year average is 20%/√(50) = ~ 3%,

then the standard deviation in the total return over a 25 year forecast period is 20%*√ (25) = 100% coming from volatility, and 3%*25 = 75% coming from estimation error. In general, this ratio applies when the period over which the mean is estimated is twice as long as the period over which it is used.

Unfortunately almost everyone ignores the error term, which clearly should not be ignored. It's very easy to judge the effect of this estimation error by rerunning estimates over different historical periods.

Asher (2007) examines the evidence and develops the reasoning around non-linear mean reversion (to book: market ratios, dividend or earnings yields) and positive autocorrelation (momentum) and how these can be justified and modelled. These both reduce the measurement error a little. The mean reversion gives a higher value to the equity premium in Australia as the dividend yield rises above 4%. The size of the estimation error does however remain significant.

5.2 Historical analysis

The past not a perfect guide to the future, but it is not all that we have. We also have the present, the IEP and the actuarial ability to make judgements about what is possible in the future.

The actual HEP earned over any particularly period can be regarded as a single observation of a random variable, but there is no agreement as to whether the volatility is around a fixed or a moving expected value.

The expected value of the HEP - measured by historical analysis - will therefore depend on the model that is used to measure it. Models may take some or all of the following into account:

- Positive autocorrelation (momentum) in price changes over some shorter periods (less than two years probably)
- Negative correlation (correction) in price changes over longer periods, but this could be a consequence of previous momentum
- Mean reversion to a value or range that incorporates earnings, dividends or book values – and that may need adjustment for inflation and GDP growth. Mean reversion does not appear to be linear but greater from extreme market positions
- Inflation and changes to inflation

- Demographic and social changes that change the demand and supply of capital in general - and for particular, credit, bonds, equities and financial instruments, as well as goods and services produced by companies
- Variables that proxy for significant changes in monetary and fiscal policy

We note that some studies of historical equity data use long periods of equity return data in order to reduce the measurement error noted earlier. It is important to note that the world is not static, so historical data, especially over long periods of time is not necessarily reflective of the current state of the world, let alone the future. The recent global financial crisis is an example of this.

The use of the HEP is critical to the choice of model and data to be used. There needs to be consistency with both these aspects across time. If there has been movement there needs to be understanding of why the movement occurred and how therefore to adjust for it. The person using the model has to take subjective judgements on market shifts as well as individual company issues and decide how to allow for these.

The HEP is often measured from one point to another, but this is obviously very crude and unreliable unless the measurement error is carefully determined and disclosed. One must be careful not to introduce bias into the model in selecting the period over which to obtain data. The model to be used needs to be rigorously specified.

5.3 Bias in the historical record

In thinking about the causes of historical returns using the filter of a DCF framework it one can identify three main reasons why equities fluctuate in value:

- cash flow expectations (levels and growth) change,
- bond yields change, and
- equity risk premium change.

Each of these reasons has a different effect on the HEP versus the EEP causing the HEP to be a biased estimate of the EEP. For example, assume that the equity risk premium has (over a long period of time) gone from a high value to a low value. Then:

- the reduction in the discount rate will cause a capital gain (PE expansion) over the period leading to a high HEP, but
- the Expected Equity Premium (EEP) will be much lower than before due to the decline.

Sentiment is recognised as a critical variable, which is particularly difficult to model. The recent financial crisis might, for instance, be expected to create greater risk aversion amongst investors, which should depress the price of equities. Greater risk aversion amongst operating companies and consumers may however reduce profits and equity returns. Similarly, optimism about the future equity risk premium drives up share prices and has the contradictory effect of reducing the future ERP.

5.4 Historical results

Reproduced below are two tables showing historical returns for two very long periods of time.

Table 1 summarizes the returns on the major US asset classes over the period 1792 to 1925.

Table 1: Summary statistics for major U.S. asset classes

Stock Total Returns, U.S. Bond Yields, Call money rates and inflation 1792 - 1925

	Arithmetic Return	Geometric Return	Standard Deviation
Stocks total return	7.93%	6.99%	14.64%
Cap Appreciation	1.91%		
Income	6.01%		
Bonds	4.17%	4.16%	4.17%
Commercial paper	7.62%	7.57%	3.22%
Inflation	0.85%	0.61%	7.11%

Source: Goetzmann and Ibbotsen (2005) History and the Equity Risk Premium

Table 2 presents summary statistics over the period 1926 to 2004. The arithmetic average return of common stocks over the second period is 400 basis points higher than in Table 1. In real terms, however, this differential is slightly less dramatic: 7.08% to 9.27%.

Table 2: Summary statistics for major U.S. asset classes

Total Returns in US stocks, Bonds, Bills and inflation 1926 -2004

	Arithmetic Return	Geometric Return	Standard Deviation
Stocks total return	12.39%	10.43%	20.31%
Cap Appreciation	7.85%		
Income	4.27%		
Long-term government bonds	5.82%	5.44%	9.30%
Treasury bills	3.76%	3.72%	3.14%
Inflation	3.12%	3.04%	4.32%

Source: Ibbotsen Associates, Chicago; Stocks, bonds, bills and inflation; 2005 yearbook

While the results above look quite different at first glance, analysis reveals that the returns over the two periods are not statistically significant given the volatility.

5.5 Sensitivity

We note that in each area of use, the size of the equity premium can have a significant impact on the results, but that opinions on the actual size of the equity premium vary widely.

Arnott and Bernstein (2002) provide some of the evidence that there has been considerable debate and misunderstanding of the size of the equity risk premium amongst academics let alone financial advisors. Fernandez (2009) reviewed 150 textbooks on corporate finance and valuation published between 1979 and 2009. He found that their recommendations regarding the equity premium range from 3% to 10% and that the 5-year moving average has declined from 8.4% in 1990 to 5.7% in 2008 and 2009.

We would suggest that there is close to a consensus that investment in the share market is likely to yield from 3% to 6% more over the long term. Credit Suisse (2008) provides a details analysis of historic yields by country for the past 100 years. The ERP can be as high as the 6% that they calculate for Australia. It is however just under 4% for the World Average and for such countries as Canada, New Zealand, Sweden and the UK. The latter may be more typical. The 4% must be further reduced for the costs of investing, which typically vary between 0.5% and 1% annually.

It is therefore critically important to consider the sensitivity of results to assumptions as to the ERP.

- In portfolio construction, the percentage of assets allocated to equities will rise if the ERP is higher, so an over-estimate may lead to an excessively risky portfolio
- In valuation, an excessively high ERP will lead to an undervaluation of more risky projects or excessively high premium rates
- In projections, an excessively high ERP may lead to over-optimism

We note that many recommendations and papers fail to consider the possibility that different people may have different views of the ERP.

6 Conclusion and further research

After surveying the bewildering field of equity premium research, practice and opinion, the authors are struck mostly by the ability of the Fernandez categories to help clarify the differences in equity risk premia definitions and how they relate to usage.

The concept of the Required Equity Premium (REP) obviously inspires the incorporation of the equity risk premium in liability discount rates – to meet the liabilities of the asset owner, the return needs to be at a certain level. As should be clear from actuarial education, the actual returns from equity investing are not guaranteed no matter how much they are wished for.

Caution needs to be taken about assuming that the Historical Equity Premium (HEP) represents an unbiased estimate of the future.

Explanations of the Expected Equity Premium (EEP) *in equilibrium* is a major undertaking of academic research but may be less practical for application to real-world problems.

Going forward the group intends to pursue the following and is interested in discussing these different ideas:

- Producing a guidance note to assist practitioner actuaries in the employment of equity premium.
- Performing a survey of practitioners.
- Provide input to the education process to allow an improvement in the course materials.

We believe the survey would have the benefits of allowing actuaries to obtain a view on the market range of equity premiums in use so ensuring either that they are within an acceptable range, or have the opportunity to justify any discrepancies. Experience with other surveys of this type indicate that they tend to reduce the outliers and create a more informed consensus. Given the possibility that the ERP varies over time, the combined judgement of participants in the survey may give a better indication of future expectations.

7 Bibliography

Arnott, R. D. and Bernstein, P. L., 2002, *What Risk Premium is "Normal"*. Financial Analysts Journal.

Asher, A, 2007, *Mean reversion in investment markets: the implications for investors and regulators*, Australian Actuarial Journal, Volume 13.2: 721-770

Brailsford, T. J., Handley, J. C. et al., 2007, *A Re-Examination of the Historical Equity Risk Premium in Australia*, Social Science Research Network eLibrary.

Campbell, J. Y. and Thompson, S. B., 2005, Predicting the Equity Premium Out of Sample: Can Anything Beat the Historical Average?, Social Science Research Network eLibrary.

Carhart, M., 1997. On persistence of mutual fund performance. Journal of Finance 52, 57-82.

Chan, Louis K. C. and Lakonishok Josef , 2002, *Value and Growth Investing: A Review and Update* http://www.lsvasset.com/pdf/Value-Review.pdf

Clarke, R., De Silva, H., and Thorley, S., 2010, *Know your VMS exposure*, The Journal of Portfolio Management, 36.2: 52-59.

Cochrane, J. H., 1999, *New facts in finance*, Economic Perspectives, Federal Reserve Bank of Chicago. http://faculty.chicagobooth.edu/john.cochrane/research/Papers/ep3Q99_3.pdf

Cochrane, J. H., 2010, *Asset Pricing*, Economic Perspectives, Princeton University Press.

Credit Suisse Global Investment Returns Yearbook 2010

Day, A., 2004, *Financial Economics and Actuarial Practice*, North American Actuarial

Journal 8.3: 90-102

Dimson, E., Marsh, P. et al., 2006, *The Worldwide Equity Premium: A Smaller Puzzle*, Social Science Research Network eLibrary.

Fernandez, P, 2009, *The Equity Premium in 150 Textbooks*, Social Science Research Network eLibrary.

Fitzherbert, R., 2006, *What causes the equity premium?* Presented to the 11th Finsia and Banking and Finance Conference http://www.melbournecentre.com.au/Finsia_MCFS/Monday/Stream%201/Fitzherbert_paper.pdf

Fitzherbert, R, 2004, *Investment Principles for Actuaries*, The Institute of Actuaries of Australia.

Goetzmann, W. N. and Ibbotson, R. G., 2005, *History and the Equity Risk Premium*, Social Science Research Network eLibrary.

Gordon, M. J. and Shapiro, E., 1956, *Capital Equipment Analysis: The Required Rate of Profit*, Management Science 3.1: 102-110

Handley, J.C., 2008, *A Note on the Historical Equity Risk Premium*, University of Melbourne.

Hung, Chi-Hsiou, Momentum, Size and Value Factors versus Systematic Co-Moments in Stock Returns (July 9, 2008). Available at SSRN: http://ssrn.com/abstract=965765

Ibbotson, R. G. and Chen, P., 2002, *Stock Market Returns in the Long Run: Participating in the Real Economy*, Social Science Research Network eLibrary.

Ibbotson, R. G., 2005, *Stocks, bonds, bills and inflation*, 2005 yearbook, Ibbotson Associates.

International Actuarial Association, 2008, *A note on Financial Economics*, The International Actuarial Association.

Merton, R.C., (1973), *An Intertemporal Capital Asset Pricing Model.* Econometrica 41.5: 867-887.

Miller, M. H. and Modigliani, F., 1961, *Dividend Policy, Growth, and the Valuation of Shares*, Journal of Business, 34: 411-433.

Sefton, J. A., and Snowcroft, A., 2005, *Understanding Momentum*, Financial Analysts Journal, 61 2: 64-82.

Song, Z., 2007, *The Equity Risk premium: An Annotated Bibliography*, The Research

Foundation of CFA Institute Literature Review.

Spyrou, S., 2004, *Are stocks a good hedge against inflation? evidence from emerging markets*, Applied Economics, 36.1: 41-48.

Welch, I., 2008, The Consensus Estimate for the Equity Premium by Academic Financial Economists in December 2007, Social Science Research Network eLibrary abstract=1084918.

Appendix 1: Literature review

Song: The Equity Risk premium: An Annotated Bibliography. Available at
http://www.cfapubs.org/doi/pdfplus/10.2470/rflr.v2.n1.4477

This is a paper produced for the CFA that gives a recent history of research and practice in the investment arena. This review and reading list provides practitioners with an excellent introduction to the current thinking, work and points of difference in the investment arena on equity premium issues.

In this paper the equity premium is broadly defined as the difference between the expected total return on an equity index and the return on a riskless asset. The magnitude of the equity premium, arguably the most important variable in financial economics, affects the asset allocation decisions of individual and institutional investors, and the premium is a critical factor in estimating companies' costs of capital. This literature review explores research by academics and practitioners on this topic during the past three decades.

The paper identifies three major themes in recent research in this area. The first builds on Gordon and Shapiro's suggestion that a dividend discount model (DDM) be used to determine the required return on capital for a project, thereby determining the ERP.

The second theme is based on the work of Ibbotson and Sinquefield. This decomposes historical returns on an equity index into a part attributable to the riskless rate and a part attributable to the equity premium.

The third and most recent theme comes from Mehra and Prescott's 1985 article, "The Equity Premium: A Puzzle". The puzzle is defined as the problem of the historically observed ERP over a long period being too high to be explained by asset models, or indeed intuition. While this puzzle has generated a good deal of research, most practitioners seem to use a DDM model to determine estimates of the ERP for use.

This paper gives a potted history of the various research papers that attempt to explain the puzzle referred to above. These are all papers published in the investment sphere and provide a good overview of recent work.

The various (and quite different, almost unrelated) approaches to estimating the equity risk premium is best summarized by Ibbotson and Chen ("The Supply of Stock Market Returns," Ibbotson Associates, 2001), who categorized the estimation methods into four groups:

1. *Historical method.* The historical equity risk premium, or difference in realized returns between stocks and bonds (or stocks and cash), is projected forward into the future.

2. *Supply-side models.* This approach uses fundamental information, such as earnings, dividends, or overall economic productivity, to estimate the equity risk premium

3. *Demand-side models.* This approach uses a general equilibrium or macroeconomic model to calculate the expected equity return by considering the payoff demanded by investors for bearing the risk of equity investments. Mehra and Prescott (1985) is the best known example of this approach, and the "puzzle debate" is an attempt to reconcile the results of this approach with the much higher ERP estimates given by the other approaches.

4. *Surveys.* An estimate of the equity risk premium is obtained by surveying financial professionals or academics (e.g., Welch 2000). Such results presumably incorporate information from the other three methods.

In closing, the equity risk premium has been the topic of intense and often contentious research over at least the last three decades. As Siegel (2005) said, although there are good reasons why the future equity risk premium should be lower than it has been historically, a projected equity premium of 2 percent to 3 percent (over long term bonds) will still give ample reward for investors willing to bear the risk of equities.

Arnott, R. D. and P. L. Bernstein (2002). "What Risk Premium is "Normal"?" Financial Analysts Journal.

We are in an industry that thrives on the expedient of forecasting the future by extrapolating the past. As a consequence, investors have grown accustomed to the idea that stocks "normally" produce an 8% real return and a 5% risk premium over bonds, compounded annually over many decades. Why? Because long-term historical returns have been in this range, with impressive consistency. Because investors see these same long-term historical numbers, year after year, these expectations are now embedded into the collective psyche of the investment community.

Both figures are unrealistic from current market levels. Few have acknowledged that an important part of the lofty real returns of the past has stemmed from rising valuation levels and from high dividend yields which have since diminished. As this article will demonstrate, the long-term forward-looking risk premium is nowhere near the 5% of the past; indeed, it may well be near-zero today, perhaps even negative. Credible studies, in the US and overseas, are now challenging this flawed conventional view, in well-researched studies by Claus and Thomas [2001] and Fama and French [2000, Working Paper], to name just two. Similarly, the long-term forward-looking real return from stocks is nowhere near history's 8%. Our argument will show that, barring unprecedented economic growth or unprecedented growth in earnings as a percentage of the economy, real stock returns will probably be roughly 2-4%, similar to bonds. Indeed, even this low real return figure assumes that current near-record valuation levels are "fair," and likely to remain this high in the years ahead. "Reversion to the mean" would push future real returns lower still.

Furthermore, if we examine the historical record, neither the 8% real return nor the 5% risk premium for stocks relative to government bonds has ever been a realistic expectation (except from major market bottoms or at times of crisis, such as wartime). Should investors require an 8% real return, or should a 5% risk premium be necessary to induce an investor to bear stock market risk? These returns and risk premiums are so grand that investors should perhaps have bid them away a long time ago - indeed, they may have done so in the immense bull market of 1982-1999.

Intuition suggests that investors should not require such outsize returns, and the historical evidence supports this view. This is a topic meriting careful exploration. After all, according to the Ibbotson data, investors earned 8% real returns over the past 75 years, and stocks have outpaced bonds by nearly 5% over the past 75 years. So, why shouldn't investors have expected these returns in the past and why shouldn't they continue to do so? Expressed in a slightly different way, we examine two questions. First, can we derive an objective estimate of what investors should have had good reasons to have expected in the past? And, why should we expect less in the future than we've earned in the past?

The answers to both questions lie in the difference between the observed excess return and the prospective risk premium, two fundamentally different concepts that unfortunately carry the same label, "risk premium." If we distinguish between past excess returns and future expected risk premiums, it is not at all unreasonable that the future risk premiums should be different from past excess returns.

This is a complex topic, requiring several careful steps to evaluate correctly. To gauge the risk premium for stocks relative to bonds, we need an expected real stock return and an expected real bond return. To gauge the expected real bond return, we need both bond yields and an estimate of expected inflation through history. To gauge the expected real stock return, we need both stock dividend yields and an estimate of expected real dividend growth. Accordingly, we go through each of these steps, in reverse order, to form the building blocks for the final goal: an estimate of the objective, forward-looking equity premium, relative to bonds, through history.

Brailsford, T. J., J. C. Handley, et al. (2007) A Re-Examination of the Historical Equity Risk Premium in Australia (April 2007) Available at: http://ssrn.com/paper=982043

In light of the ongoing debate over the value of the equity premium, its increasing use in the regulatory setting, and the impact of dividend imputation on the premium, this paper presents a timely new look at the historical equity premium in Australia, and provides an improved understanding of the historical record. We document concerns about data quality which become increasingly important the further back in time one looks. In particular, there are sufficient question marks over the quality of data prior to 1958 to warrant any estimates based thereon to be treated with caution. Accordingly, we present a new set of estimates of the historical equity risk premium corresponding to periods of increasing data quality but of decreasing sample size. Relative to bonds (bills), the equity premium has averaged 6.3% (6.8%) pa over 1958-2005, which is a period of relatively good data quality. Together with other results in the paper, the findings reveal a historical estimate that is substantially less than widely cited historical studies would otherwise indicate. We reconcile prior evidence through documenting a dividend adjustment that has typically been overlooked. We also provide estimates that incorporate an adjustment for imputation credits.

Campbell, J. Y. and S. B. Thompson (2005) Predicting the Equity Premium Out of Sample: Can Anything Beat the Historical Average? (July 2005) Available at: http://ssrn.com/abstract=755704

A number of variables are correlated with subsequent returns on the aggregate US stock market in the 20th Century. Some of these variables are stock market valuation ratios; others reflect patterns in corporate

finance or the levels of short- and long-term interest rates. Amit Goyal and Ivo Welch (2004) have argued that in-sample correlations conceal a systematic failure of these variables out of sample: None are able to beat a simple forecast based on the historical average stock return. In this note we show that forecasting variables with significant forecasting power in-sample generally have a better out-of-sample performance than a forecast based on the historical average return, once sensible restrictions are imposed on the signs of coefficients and return forecasts. The out-of-sample predictive power is small, but we find that it is economically meaningful. We also show that a variable is quite likely to have poor out-of-sample performance for an extended period of time even when the variable genuinely predicts returns with a stable coefficient.

Dimson, E., P. Marsh, et al. (2006) The Worldwide Equity Premium: A Smaller Puzzle (April 7, 2006) Available at: http://ssrn.com/abstract=896169

We use a new database of long-run stock, bond, bill, inflation, and currency returns to estimate the equity risk premium for 17 countries and a world index over a 106-year interval. Taking U.S. Treasury bills (government bonds) as the risk-free asset, the annualised equity premium for the world index was 4.7% (4.0%). We report the historical equity premium for each market in local currency and US dollars, and decompose the premium into dividend growth, multiple expansion, the dividend yield, and changes in the real exchange rate. We infer that investors expect a premium on the world index of around 3-3 1/2% on a geometric mean basis, or approximately 4 1/2-5% on an arithmetic basis.

Fernandez, P (2009). "The Equity Premium in 150 Textbooks." Available at: http://ssrn.com/abstract=1473225

The author has reviewed 150 financial economics textbooks to determine the teachings they are providing on equity premiums. The best summary is provided in the following extract of the introduction to this paper:

"The equity premium (also called *market risk premium, equity risk premium, market premium* and *risk premium*), is one of the most important and discussed, but elusive parameters in finance. Part of the confusion arises from the fact that the term equity premium is used to designate four different concepts:

1. **Historical** equity premium (HEP): historical differential return of the stock market over treasuries.

2. **Expected** equity premium (EEP): expected differential return of the stock market over treasuries.

3. **Required** equity premium (REP): incremental return of a diversified portfolio (the market) over the risk-free rate required by an investor. It is used for calculating the required return to equity.

4. **Implied** equity premium (IEP): the required equity premium that arises from assuming that the market price is correct.

I review 150 textbooks on finance and valuation and find that, as shown in **Table 1**, different books propose different identities among the four equity premiums defined above:

• 129 claim that the REP = EEP.

• 12 do not say how they calculate the REP that they use.

• Damodaran (2001a, 2009) and Arzac (2005, 2007) assume that REP = IEP.

• Penman (2001, 2003) maintains that *"no one knows what the REP is."*

• Fernandez (2002, 2004) claims that "different investors have different REPs" and that "there is not a premium for the market as a whole"

• Black *et al.* (2000) calculate the EEP as an average of surveys and HEP.

Table 1. Assumptions and recommendations of the 150 textbooks

Assumption	Number of books	Recommendation		
		Max	Min	Average
REP = EEP	129	10.0%	3.0%	6.7%
Do not say how they calculate the REP	12	9.0%	3.0%	6.1%
REP = IEP	4	6.5%	4.0%	4.8%
"No one knows what the REP is"	2	6.0%	6.0%	6.0%
"different investors have different REP's	2	4.0%	4.0%	4.0%
"Average HEP and surveys"	1			4.2%
Total	150	10.0%	3.0%	6.5%

Table 2 contains some details about the 129 books that explicitly assume that the REP is equal to the EEP:

• 82 books use the HEP as the best estimation of the EEP.

• 12 books use the HEP as a reference to calculate the EEP: 10 maintain that the EEP is higher than the HEP and 2 that it is lower.

• 27 books do not give details of how they calculate the HEP.

• Brealey and Myers (2000, 2003, and 2005) *"have no official position."*

• 2 claim that EEP is proportional to the risk-free rate.

• Bodie and Merton (2000) calculate EEP = A σ2 M = 8%.

• Titman and Martin (2007) use the EEP "*commonly used in practice."* Young and O'Byrne (2000) propose the *"widely used".*

Table 2. Assumptions and recommendations of the 129 books that assume that REP = EEP

Assumption	Number of books	Recommendation		
		Max	Min	Average
EEP = HEP	82	9.5%	3.0%	6.9%
EEP = arithmetic HEP vs. T-Bills	26	9.5%	7.1%	8.5%
EEP = arithmetic HEP vs. T-Bonds	6	7.8%	5.0%	7.0%
EEP = geometric HEP vs. T-Bills	8	8.1%	5.3%	6.7%
EEP = geometric HEP vs. T-Bonds	28	7.5%	3.5%	5.5%
Do not say which HEP they use	14	8.5%	3.0%	6.8%
EEP < HEP	10	7.8%	3.0%	4.8%
EEP > HEP	2	9.0%	9.0%	9.0%
Do not say how they get EEP	27	10.0%	3.0%	6.6%
No official position	3	8.0%	6.0%	7.3%
REP proportional to RF	2	3.3%	4.7%	4.0%
REP = A σ2M	1			8.0%
"commonly used in practice"; "widely used"	2	3.5%	5.0%	4.3%
Total	129	10.0%	3.0%	6.7%

119 of the books explicitly recommend using the CAPM for calculating the required return to equity, which continues being, in Warren Buffett's words, *"seductively precise."* The CAPM assumes that REP and EEP are unique and equal**.**

Goetzmann, W. N. and R. G. Ibbotson (2005). "History and the Equity Risk Premium." SSRN eLibrary.

We summarize some of our own past findings and place them in the context of the historical development of the idea of the equity risk premium and its empirical measurement by financial economists. In particular, we focus on how the theory of compensation for investment risk developed in the 20th century in tandem with the empirical analysis of historical investment performance. Finally, we update our study of the historical performance of the New York Stock Exchange over the period 1792 to the present, and include a measure of the U.S. equity risk premium over more than two centuries. This last section is based upon indices constructed from individual stock and dividend data collected over a decade of research at the Yale School of Management, and contributions by other scholars.

Handley, J.C. "A Note on the Historical Equity Risk Premium"

Advice is given on a number of aspects of determining historical excess returns for equity. The approach taken is to use the methodology of Officer and Bishop (2008) using observable excess returns over 10-year Government bonds with adjustments for market risk.

The result of this work is a set of tables and a graph. The equity risk premium identified here seems to be largely unpredictable.

Welch, I. (2008). "The Consensus Estimate for the Equity Premium by Academic Financial Economists in December 2007." SSRN eLibrary.

A sample of about 400 finance professors estimates the 1-year equity premium and the 30-year geometric equity premium to be about 5%, as of year-end 2007. The sample inter-quartile range is 4% to 6%. The typical range recommended in their classes is a little higher (from 4% to 7%, with a mean of 6%). Since 2001, participants have become more bearish (by about 0.5%).

The participants estimate the 30-year arithmetic equity premium estimate to be about 75 basis points higher than its geometric equivalent; and they estimate the 30-year geometric expected rate of return on the stock market to be about 9%.

75% of finance professors recommend using the CAPM for corporate capital budgeting purposes; 10% recommend the Fama-French model; 5% recommend an APT model.

8 Appendix 2: Draft survey questions

The Group would like to conduct regular surveys of members with regard to the use and estimation of equity premium in practice. We have identified below a number of questions that we believe it would be beneficial to pose. If there are other questions that you think should be asked or changes that you think should be made to the questions identified here, could you please let one of us know.

1. Which of the following definitions of the equity premium is consistent with your beliefs:

a) The expected excess of the return of equities over the sovereign bond rate over a period of time.

b) The out-performance of shares over bonds over the long term.

c) The reward for the additional risk of investing in higher risk assets.

d) Doesn't exist.

2. Suppose the equity premium is defined as:

"The expected excess of the return of equities over the sovereign bond rate over a period of time."

Do you believe in the existence of an equity premium? (Yes/ No)

(Please provide comments)

_____
_____
_____

3. Based on the definition of the equity premium stated above, what do you think the equity premium would be in the following scenarios?

over the next year, assuming the market economy continues as it currently is (weak/ stagnant growth, no major events):

(i) 0%

(ii) 1%

(iii) 2%

(iv) 3%

(v) other, please specify_____

over the next 30 years, assuming the market returns to a long-term equilibrium level:

(i) 0%

(ii) 1%

(iii) 2%

(iv) 3%

(v) other, please specify_____

4. For what purpose do you need an estimate of the equity premium?

Valuation of assets

Valuation of liabilities

Valuation of assets and liabilities

Other – please specify_____
_____

5. What best describes your current role:

a) Student

b) FIAA

(i) General Insurance

(ii) Life Insurance

(iii) Superannuation

(iv) Investments

(v) Other (please state)

Additional Comments_____

6. How many years of work experience have you had in your current field:

a) 0 - 5 years

b) 5 - 10 years

c) 10 - 15 years

d) 15 - 20 years

e) 20 years +