RE-ASSESSING THE EQUITY RISK PREMIUM

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ABSTRACT

Estimates of the historical equity risk premium in the UK are in the range 7% to 9% per annum. Until recently, portfolio investors and industrialists have been encouraged to use a premium of this order in making investment decisions. The purpose of this paper is to review the risk premium debate and to re-inforce the case for rejecting historical experience in formulating future investment plans. A simulation of historical investor expectations suggests that a disciplined appraisal would have identified an average risk premium of less than 2% per annum. A forward-looking assessment of reasonable expectations suggests that a risk premium assumption of around 2.5% would be realistic at present.

ACKNOWLEDGEMENT

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1. INTRODUCTION

Investors in the UK have been well rewarded historically for bearing the risks associated with equity investment. While there have been periods of extreme volatility - notably during the 1970s - equity returns have averaged over 9% more per annum than long gilt returns during the second half of this century. Studies of longer periods, both in the UK and the US, show comparable results. This difference in returns is termed the *equity risk premium* - the additional return earned above the risk-free rate of return for bearing equity risk.

Until recently, historical long-term experience has been promoted as the guide to expectations, despite the fact that the high level of risk premium sustained has been recognised as an unresolved "puzzle" by many economists and financial analysts.

The practice of assuming that ex-post measurement of the equity risk premium can be used as a satisfactory guide to the future has come under increasing challenge in recent years, however. Nowhere has the debate been keener than in the exchanges between the privatised utilities and their various regulators. Only five years ago the utilities were arguing strongly that equity risk premia of 8% to 9% should be allowed within cost of capital assessments, since that is what markets had delivered historically. The regulators are now of the view that historical experience is of less relevance. Indeed, a recent report by the House of Commons Public Accounts Committee (1997) notes that there is now an increasing consensus around a rate of 6.5% to 7.5% for the real cost of capital compared with estimates of up to 15% in the past. A reduction of at least 3 percentage points in the equity risk premium assumption is recognised as being partly responsible.

This paper is organised as follows. Section 2 reviews the risk premium debate. Data are also presented for long-run equity and gilt returns and risk premia between 1924 and 1996. Sections 3 and 4 present a simulation of historical investor experience. Refining earlier work (FitzGerald, 1992 and 1992a), the simulation attempts to measure what investors would actually have assessed the equity risk premium to be from year to year had they made such assessments in a disciplined fashion. The simulation suggests that, over the second half of the century, the ex-ante equity risk premium averaged less than 2% per annum. The developing "cult of the equity", rising dividend expectations and increased awareness of inflation risks were the main contributors to the gap between ex-ante expectations and ex-post experience.

The realistic level for a current risk premium assumption is discussed in Section 5. Using optimistic economic assumptions, the conclusion is that a risk premium assumption of 2.5% would be reasonable to use in a forward-looking appraisal.

2. THE EQUITY RISK PREMIUM DEBATE

Investors are risk-averse. They require greater return for bearing greater risk and the degree of risk aversion varies from investor to investor.

2.1 Return and risk characteristics

The returns to UK investors from conventional gilt-edged stocks are generally regarded as risk-free. Interest payments and redemption values are known; consequently redemption yields, or total returns, over the period to redemption are known at the time of investment. But the returns available on conventional gilts are only risk-free if held to redemption. Returns to redemption are also only risk-free in a nominal sense. The levels of inflation over the periods to redemption are unknown at the time of investment and can only be assessed. Consequently, the real returns on conventional gilts are not risk-free.

UK government index-linked securities have been available since 1981. Both the interest stream and the redemption value for such securities are linked to the Retail Price Index, but there is an eight-month lag in the indexing process. Leaving aside this technicality, index-linked gilts can be said to provide risk-free returns in a real sense but, of course, not in a nominal sense.

Equities are regarded as riskier assets than either conventional or index-linked gilts since future income streams are unknown, both in nominal and in real terms, and there are not normally fixed redemption dates or redemption values. Traditional valuation methodology, pioneered by John Burr Williams (1938), suggests that the intrinsic value of an equity is the discounted value of all expected future dividend payments. If we assume that market price is equal to intrinsic value then we can derive the implied discount rate. Simplifying the relationship by assuming a constant growth in dividends to infinity provides the basic model:

Price = (Current year dividend)/(Discount rate - Long-term growth rate)

Re-arranging this expression gives:

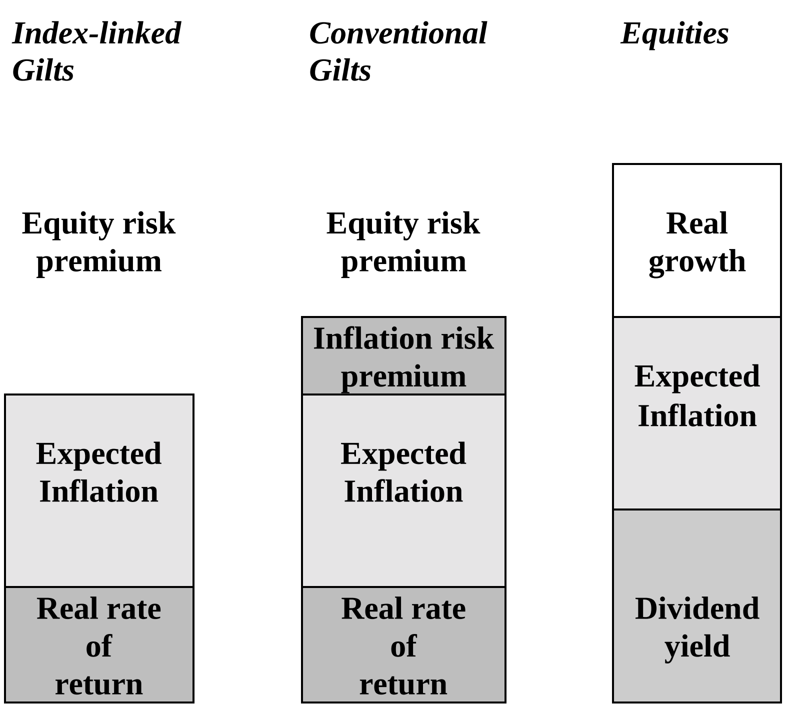
Discount rate = Current year dividend/Price + Long-term growth rate

Or, in other words:

Implied discount rate = Current year yield + Long-term growth rate

Chart 1 depicts the returns expected on the three different types of investment, index-linked gilts, conventional gilts and equities.

Chart 1 - Expected return relationships



The expected return on index-linked stock is the real rate of interest quoted at the time of investment plus whatever inflation rate materialises during the period to redemption. The main investing institutions have long-term real liabilities and will look for a higher return from conventional gilts since they give no protection against unexpected inflation. The expected return on conventional gilts can therefore be regarded as containing an additional element, an inflation risk premium, which provides compensation for the risk that inflation may exceed expectations. The case for an inflation risk premium is discussed further in 3.2

As discussed above, the rate of return available on equities can be viewed as the sum of the current year dividend yield and future annual dividend growth. The latter can be broken down further into an inflation component and a real growth component.

The return required on equities over and above conventional or index-linked gilts is called the equity risk premium. Under the assumptions made so far, the equity risk premium required over the real rate of return on index-linked will exceed the premium required over conventional gilt returns by the inflation risk premium.

It should be noted that the discussion in this paper focuses on the expectations of the long-term investor. Most attention is therefore paid to equity premia available over and above the long-term returns available on long-term risk-free alternatives. Elsewhere (Dimson and Brealey, 1978), annual premia are measured by comparison with the returns available on twelve month risk-free alternatives. The results can be appreciably different over certain periods.

There will be no attempt in this paper to make adjustments for taxation. All returns are measured on a gross basis. The findings therefore reflect closely the experience of tax free investors, although the analysis and conclusions are of relevance to all types of investor.

2.2 What premium?

The equity risk premium plays an important role in both theory and practice. Investment portfolio managers need to assess what additional returns are available for taking on the greater risks associated with equity investment and whether these additional returns, or premia, are sufficient. Corporate managers need to appraise the potential returns and risks of specific capital projects against the cost of capital. Modern financial theory provides an important tool for undertaking assessments of this kind in the form of the capital asset pricing model, which asserts:

Cost of equity capital = Risk-free rate + (Beta x Equity risk premium)

The relevance of systematic risk, as defined by beta, is in itself a contentious issue which will not be addressed in this paper. Whatever relative risk factor is used, however, the fact remains that corporate managers require to know what equity risk premium is to be plugged into models of this kind.

2.3 The evidence

Dimson and Brealey (1978) produced the first authoritative assessment of the historical risk premium in the UK. Returns on equities were compared with the returns on twelve-month Treasury Bills for each year between 1919 and 1977. The resultant excess returns were found to average 9.2% pa. The conclusion of the authors was that "this is a guide as to what investors expect the risk premium to be in the future".

Very similar results were obtained in a 1986 study (Allen *et al*) which used the long gilt yield as the risk-free benchmark. This study went one stage further, however, and simulated future returns and risk premia, using the evidence of the historical distributions.

Comparable studies of the US markets undertaken in the 1970s and 1980s showed that US experience over a long period had matched UK experience. Ibbotson and Sinquefield (1976), for example, found that the US equity risk premium between 1926 and 1974 averaged 8.6%.

Prior to the mid 1980s, however, there was little discussion as to how and why risk premia of this order had been achieved in the UK and US. Subsequently, Mehra and Prescott (1985) demonstrated, using a consumption-based capital asset pricing model, that the premium earned from US equities was excessive in relation to the additional risk undertaken. Numerous other researchers (Rietz, 1988; Constantinides, 1990, for example) also analysed this "puzzle" but no consensus view emerged regarding a plausible solution.

Despite the absence of satisfactory explanation, it is only in the past five years that the practice of using historically-achieved premia as guides to future requirements or expectations in the UK market has been seriously challenged (Scott, 1992; Jenkinson, 1993; Wilkie, 1995).

The main criticism is that, while historical experience cannot be disputed, it would be unrealistic to assume that a similar combination of economic and behavioural factors will result in similar premia in future. Two significant contributory factors are highlighted: the development of the "cult of the equity", which has boosted equity returns over the second half of the century, and the experience of periods of high inflation, which has depressed gilt returns over much of the same period.

More recently, Spencer (1996) has examined the UK premium puzzle, again using a consumption-based capital asset pricing model, and argues that the impediments to direct equity investment by individuals help to explain the size of the premium earned historically.

An increased scepticism regarding the usefulness of ex-post risk premium measures has also become apparent in exchanges between UK utilities and their respective regulators. Little more than five years ago, for example, The Water Services Association, representing the water companies, argued:

> *"It should be noted that a market risk premium of 8-9% is very widely accepted in the application of financial economics, in both the UK and the USA. It would also appear that an (arithmetic mean) market premium of 8-9% has been used in all examinations to date of the cost of capital for the other UK regulated utilities." (§5.11, Water Services Association, 1991).*

By contrast, the 1997 Price Control Review by Ofgas (1996) of British Gas' Transportation and Storage highlights the influence that recent academic work in this area has had. The Director General comments:

> *"Of all the components of CAPM, different views on the equity risk premium have been the single biggest cause of variation in CAPM estimates of cost of capital. Plausible arguments have been put forward for the premium being as*

low as 2 per cent and as high as 8 per cent. TransCo's paper on the cost of capital recognises this lack of consensus, while acknowledging that some recent academic work has pointed towards the lower end of the range. TransCo proposes the use of the range contained in the MMC's report on Scottish Hydro-Electric, 3.5 to 4.5 per cent................[Ofgas] is content to use the range proposed by TransCo."(Volume 2, p76).

2.4 Equity Risk Premium 1924-1996

Table 1 contains risk premium averages since 1924. The premium measured is that between equity and conventional long gilt returns. Averages are shown for the periods 1924 to 1950, 1951 to 1996, and for the whole period of 73 years. Although BZW data is available from 1919, the period immediately following the First World War is excluded in view of the exceptional volatility of the data.

Both arithmetic and geometric averages are shown. Readers interested in single period asset allocation strategies might wish to pay more attention to the arithmetic averages. Those more interested in long-term trends may find more use for the geometric averages. Note that the differences in averages can be significant. Wilkie (1995) has explored and presented the rationale for the alternative approaches. Other interesting discussions on the issue can be found in Scott (1992) and Ibbotson (1994).

Table 1. Market & Economic Data 1924-1996

	1924 -1950	1951 -1996	**1924 -1996**
ARITHMETIC ANNUAL AVERAGES	% pa	% pa	% pa
Equity return	8.9	17.7	**14.5**
Long gilt return	4.9	8.1	**7.0**
Equity risk premium	4.0	9.6	**7.5**
Dividend Growth	2.4	8.7	**6.3**
Inflation	2.1	6.6	**4.6**
GEOMETRIC ANNUAL AVERAGES			
Equity return	7.9	14.5	**12.0**
Long gilt return	4.4	7.2	**6.1**
Equity risk premium	3.5	7.3	**5.9**
Dividend Growth	2.0	8.5	**6.0**
Inflation	1.1	6.5	**4.5**

Raw data sources: FT-Actuaries, BZW, Official Statistics.

3. A SIMULATION OF HISTORICAL EXPECTATIONS

This section presents a simulation of historical investor expectations. The prime objective is to assess whether ex-post experience has been different from ex-ante expectations. In other words, did investors look to earn risk premia of the order shown in Table 1, or was the outcome significantly above or below expectations?

3.1 Simulating the risk premium

The composition of the returns expected from index-linked, conventional gilts and equities was given in Chart 1, viz:

Index-linked return	=	Real rate of interest
	+	Inflation
Conventional gilt return	=	Real rate of interest
	+	Inflation risk premium
	+	Expected inflation
Equity return	=	Current year yield
	+	Expected Inflation
	+	Expected real dividend growth

The simulation is confined to the second half of the century, a period of 46 years. The main reason for excluding earlier years is to avoid the added complication of simulating expectations during periods of deflation, such as the 1930s. More complex models of expected return structures than those assumed here would be necessary to cope with such circumstances satisfactorily.

Risk premia simulated relate to the difference in returns between equities and conventional gilts. Premia over index-linked gilts can also be calculated since 1981, but the main purpose of including index-linked data in this analysis is to assess inflation expectations since that date.

3.2 Methodology

The various return components cited are determined as follows:

<u>Real rate of interest</u>

For the period since 1981, this is taken to be the real rate of return on long index-linked gilts. Assessing real rates for earlier years poses a considerable problem. For the period prior to 1981 a constant real rate of interest of 3.5% is assumed, this being the long-term average identified by Wilkie (1995) and also a normal trading level for index-linked stock in recent years. It should be noted however that, in its examination of the case for indexation, the Wilson Committee (1980) suggested that a lower rate might be appropriate:

"It seems likely that in present circumstances institutional investors would look for yields on gilt-edged indexed securities of around 2-3 per cent, which would be broadly consistent with current actuarial assumptions, though the actual yield would be decided by the market and could well be less than this ". (Paragraph 834).

Expected inflation

The difference between the redemption yield on conventional gilts and the real rate of interest available on index-linked is normally termed the "inflation gap". We assume that this inflation gap is comprised of the expected long-term inflation rate plus an inflation risk premium.

"Rule of thumb" approaches to assessing long-term inflation expectations have developed over the period since index-linked were introduced in 1981 whereby a certain proportion of the inflation gap is attributed to the actual expectation and the remainder is flagged as the inflation risk premium.

Some commentators (Wilkie, 1995, for example) argue that an inflation risk premium of zero should be assumed since it is not clear what sign the premium should have, given competing demands in the market-place for real and nominal returns. Other commentators such as Woodward (1990) and Chu (1995) have identified a positive inflation risk premium in the UK. However, Woodward concludes that calculation of the premium is "an intractable problem" and chooses to ignore it in measuring inflation expectations. Chu (1995) concludes that the inflation risk premium is too significant to ignore and that doubts must be cast on methodologies which assume a zero inflation premium.

The evidence suggests that there has been a positive and significant inflation risk premium for much of the period we are observing and we concur that it is too significant to ignore. The first objective is to construct a rule of thumb approach to decomposing the inflation gap using data from the period for which index-linked have existed - the period for which "quoted" inflation gaps have been available.

Developing a rule of thumb approach of this kind inevitably involves a degree of circularity, the starting point in this case being to find a best-fit model of long-term inflation expectations. Such long-term expectations are assumed to be influenced by recent experience and/or near-term expectations. Inflation gap data for the period since 1981 is regressed therefore against various combinations of historic and forecast inflation data. The average inflation rate for the window comprising data five years backwards and five years forward (i.e assuming perfect foresight) is found to have the highest correlation (79%) with the inflation gap between conventional gilts and index-linked over the period. Conveniently, the co-efficient attaching to the assumed inflation expectation is almost exactly unity with a very significant residual. The precise relationship is:

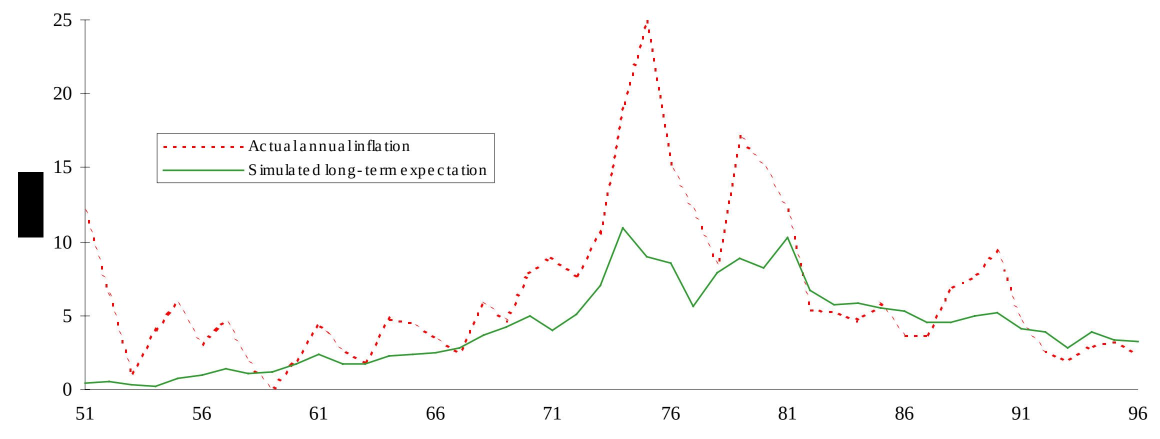
Inflation gap = 0.72 + (1.03 x 10 year inflation window)
(R-squared = 0.794, t-statistic = 6.8)

Looking at this in reverse, by making the inflation window the dependent variable in the regression, suggests that, on average, 77% of the inflation gap represents expectations:

10 year inflation window = 0.54 + (0.77 x Inflation gap)

This result provides justification for a rule of thumb to be applied over the whole 46 year period in decomposing the inflation gap into inflation expectation and risk premium components. The rule of thumb adopted is that 80% of the inflation gap represents the long-term inflation expectation and that 20% represents the inflation risk premium. The resultant simulation of long-term inflation expectations for the 46 year period is shown in Chart 2.

Chart 2 - Simulated inflation expectations



An alternative approach is simply to use the 10 year average inflation window as representing long-term expectations over the entire period. However, this ignores the greater sophistication possible using “quoted” inflation gaps. A cursory examination of the raw data shows that such an approach also throws up nonsensical numbers in the earlier part of the period reviewed. In particular, it is extremely difficult to reconcile long gilt yields, inflation expectations and real rates of interest as high as the constant 3.5% assumed. The 10 year inflation window in 1954, for example, was 4.2%. This cannot be reconciled with a real rate of interest of 3.5% and a long gilt yield of just 3.8%.

<u>Real dividend growth</u>

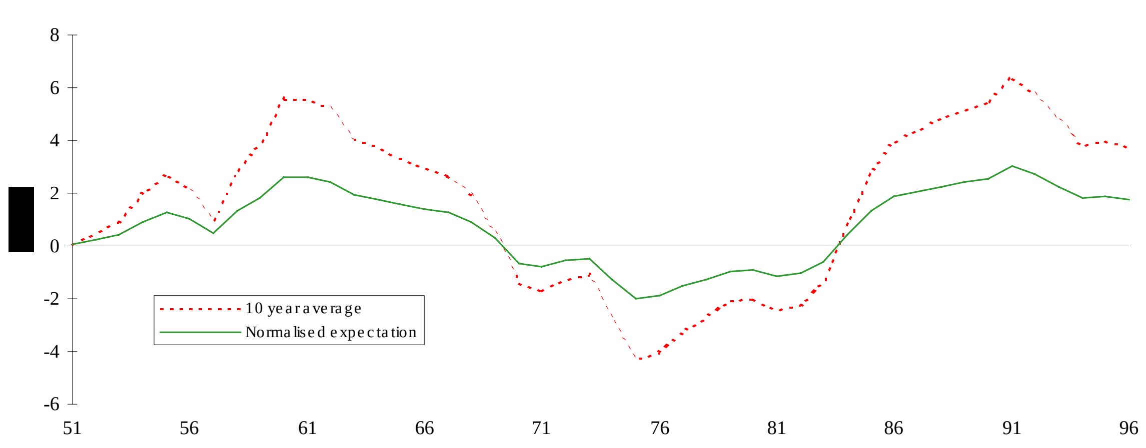
Surprisingly, there is little research undertaken in the City on long-term dividend prospects. There are usually vague assumptions made about long-term dividend growth keeping pace with general UK economic growth, although this is to simplify matters on at least two important counts. Firstly, the substantial exposure of the UK corporate sector to overseas economies and the tendency to gain diversification through exposure to growth product areas in strong economies. Secondly, aggregate dividend growth has been boosted, and will continue to be boosted for some time to come, by the payouts of recently privatised industries. An added complication is that there is a tendency to confuse “best” expectations with “prudent” expectations. Actuarial assumptions fall into the latter category and will generally be below typical fund manager expectations.

The evidence is that real dividend growth has averaged around 1.5% pa historically (see Table 1), although a considerable acceleration has been experienced since dividend controls were abandoned in 1979. Actuarial assumptions are nevertheless still below the historical average (Thornton, 1992). Indeed, the statutory assumptions laid down by the Inland Revenue for valuing pension fund surpluses imply real dividend growth of -1.8% (Inland Revenue, 1987).

In the absence of any historical consensus data relating to real long-term dividend growth, we assume that expectations are moulded by past experience. Average ten year growth figures are derived therefore for the 46 year period and appropriately scaled to provide a more realistic distribution of long-term expectations. The distribution is set with a maximum of 3% pa and a minimum of 2% pa, as shown in Table B of the Appendix. The maximum of 3% pa occurs in 1991, influenced by average real growth of 6.4% pa over the previous decade. The minimum of -2 % pa was recorded for 1975, reflecting real growth of -4.3 % pa over the previous decade. Establishing these extremes allows all points to be transposed to fit the new "normalised" distribution:

Normalised long-term real growth expectation = 0.01 + (0.47 x 10 year average)

Chart 3 - Real dividend growth



Current year equity dividend yield

The current year equity dividend yield is the yield expected over the next twelve months. That is, gross dividends expected over the next twelve months expressed as a percentage of the current share price. Alternatively, it is the historic yield factored up by the dividend growth expected over the next twelve months:

Current year equity yield = Historic yield x (1 + expected 12 month dividend growth)

The expected 12 month dividend growth is derived using long-term inflation expectations and long-term real dividend growth expectations:

12 month dividend growth = (1+ inflation expectation) x (1+ real growth expectation) -1

3.3 Simulating the expected risk premium

The return from an equity arises through a combination of income and capital appreciation. In any year an equity investor can expect a total return comprising the current year equity yield and the capital appreciation which arises because of dividend growth. That is, if the yield requirements of investors remain unchanged, the market will tend to appreciate as its dividend base grows.

Using the simulated values for inflation and real dividend growth, therefore, it is possible to simulate at any point historically the expected return from the equity market over the next twelve months, assuming other factors unaltered. Deducting from this the expected gilt return over the next twelve months - the quoted redemption yield - provides us with a simulated value for the expected equity risk premium.

Simulated values for the inflation and dividend growth components of the expected equity returns - using the methodology described in 3.2 - are contained in the Appendix, together with the derived results for the risk premium (Tables A - C).

3.4 Equity re-rating

We have assumed that equity investors can normally expect the equity market to appreciate in line with long-term dividend growth. In any year, investors can expect a total return comprising the current year yield and the capital gain arising from growth in the dividend base.

The return that equity investors actually receive in any year may differ from this expected return for two reasons. Firstly, dividend growth during the year may diverge from what was expected. This will cause both income yield and capital appreciation to diverge from expectations. Secondly, the equity market may be re-rated. In other words, the dividend yield of the market may shift to a new level, resulting in further, unexpected capital gains or losses.

The possible causes of an equity re-rating can be identified by re-considering the components of equity and conventional gilt expected returns:

Expected equity return	=	Current year yield
	+	Expected Inflation
	+	Expected real dividend growth

Expected conventional gilt return	=	Real rate of interest
	+	Inflation risk premium
	+	Expected Inflation

As the expected equity return exceeds the expected gilt return by the expected risk premium, we have:

Current year equity yield		Expected equity risk premium
+		+
Expected inflation	=	Real rate of interest
+		+
Expected real dividend growth		Inflation risk premium
		+
		Expected Inflation

Rearranging, and cancelling the expected inflation components gives:

Current year equity yield	=	Expected equity risk premium
		+
		Real rate of interest
		+
		Inflation risk premium
		-
		Expected real dividend growth

This equation shows that the equity market will be re-rated (i.e. the yield will change) if any of the components on the right hand side changes. An increase in the equity risk premium, real rate of interest or inflation risk premium causes a rise in the equity yield. An increase in real dividend growth expectations has the opposite effect.

What may seem to be insignificant shifts in expectations can result in significant capital gains or losses. An assumed increase in real growth expectations of 0.5% pa, for example, reduces the equilibrium equity yield from, say, 4.0% to 3.5%. This implies a 14.3% capital appreciation in the equity market!

Table D in the Appendix shows the simulated changes in each of these yield components and the market movements that can be attributed to each. The total effect on market movement is the “unexpected re-rating”.

On a technical note, it should be borne in mind that the equity yield referred to above is the first year expectation. In practice, each of the components and the total yield are re-stated in historic terms by dividing through by (1 + long-term dividend growth expectation). The final analysis, shown in the Appendix, therefore explains the change in quoted historic yields from one year end to the next and the causes to which it can be attributed.

3.5 The unexpected risk premium

The actual total return provided by the equity market in any year is split into three main components:

(1) The return expected at the start of the year

(2) The unexpected return attributable to the difference between dividend growth experienced during the year and the long-term nominal expectation (termed the "dividend boost").

(3) The unexpected return attributable to a re-rating of the equity market. The re-rating in any year is further sub-divided into components.

The actual total return provided by the long gilt market in any year is split into two components, the expected return - the redemption yield at the start of the year - and the unexpected return. The latter is calculated simply as the difference between the total return recorded for any year and the expected return.

It is acknowledged that both the gilt and equity models used are simplistic since it is assumed that first year expectations (e.g. for the gilt return, inflation, real dividend growth) match long-term expectations. In so doing, they take no account of the perceived term structure of interest rates, inflation, real growth or other economic factors.

Table E in the Appendix draws together the main components of equity and gilt returns and compares expected and actual risk premia for each year.

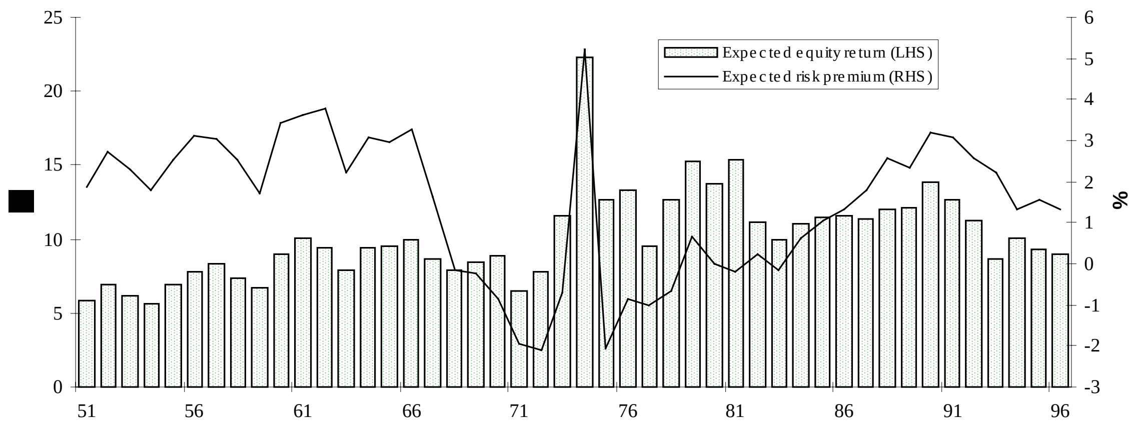
The simulation provides us with a comprehensive analysis of the expected and unexpected components of both equity and gilt returns over the 46 year period. From this data it is possible to determine how much of the large equity risk premium enjoyed over the period was unexpected and, more importantly, how it arose.

4. THE RESULTS

Simulated values for expected equity returns and risk premia are illustrated in Chart 4. Although expected equity returns were low during the 1950s and early 1960s - a period of relatively low inflation - the equity risk premium was relatively high. The key point to note, however, is that the simulated values for the risk premium over this sub-period are still less than 4% pa.

The equity risk premium declines from 1967 onwards, finally reaching a low point of -2% pa at the peak of the 1972 bull market. The simulated value for the equity risk premium at the trough of the subsequent bear market, at end 1974, is just over 5% pa. With the benefit of hindsight, this point was the best relative buying opportunity over the 46 year period, equities outperforming gilts by more than 80% during 1975.

Chart 4 - Simulated returns & premia



4.1 Explaining the divergence

These results indicate a very substantial divergence between ex-ante and ex-post values for the equity risk premium. In fact, the average value for the simulated ex-ante premium over the total period is just 1.4%, and would indeed be lower if less generous dividend growth expectations had been incorporated. This begs the question as to how such a divergence occurs.

Table 1 shows the reasons for this divergence between ex-ante and ex-post returns. It is instructive to divide the period 1951-96 into two further sub-periods, the second sub-period starting at the time of the previous change of government in 1979.

Table 2. Annual arithmetic averages (%)

		1951 -1978	**1979 -1996**	**1951 -1996**
A	Expected equity return	8.9	11.9	10.1
B	Expected gilt return	7.4	10.6	8.6
C	**EX-ANTE RISK PREMIUM (A-B)**	**1.5**	**1.3**	**1.4**
D	Unexpected dividend boost	4.1	3.9	4.0
E	Unexpected equity re-rating	3.8	3.3	3.6
F	UNEXPECTED EQUITY RETURN (D+E)	7.9	7.2	7.6
G	UNEXPECTED GILT RETURN	-2.9	3.2	-0.5
H	ACTUAL EQUITY RETURN (A+F)	16.8	19.1	17.7
I	ACTUAL GILT RETURN (B+G)	4.5	13.8	8.1
J	**EX-POST RISK PREMIUM (H-I)**	**12.3**	**5.3**	**9.6**

There is little difference in the average ex-ante premia for the two sub-periods albeit that the risk premium on offer was far more volatile during the earlier sub-period. The simulation shows an average value for the ex-ante premium of 1.5% pa up to 1978. This value falls only slightly, to 1.3%, for the sub-period starting in 1979. There is a difference of seven percentage points (12.3% v 5.3%), however, between the average ex-post risk premia recorded for the two sub-periods. And this fall in the achieved risk premium can be explained almost entirely by the turnaround in gilt performance. The first sub-period is associated with rising inflation expectations and gilt returns below expectations; the results for the second sub-period reflect a reversal of this trend. Note that average achieved equity returns were well above simulated expectations during both sub-periods.

Nominal dividend growth exceeded expectations for most of the period, the average annual "boost" from this source being 4.0%. The re-rating of the equity market provided a further annual return of 3.6% on average.

An examination of the detailed contributions to the re-rating of the equity market from year to year, shown in Appendix Table D, throws further light on how performance has consistently exceeded expectations. Average equity returns for the earlier period, 1952 - 1978, benefited considerably from a lowering in equity risk premium requirements. The simulation suggests that this factor added more than 6% on average to annual equity returns. This has no longer been a positive factor over the period since 1978. The cult of the equity had by then developed fully. However, a key factor since 1978 has been a steady rise in real dividend expectations. Rising expectations have pushed down running yield requirements and have resulted in unexpected capital gains. The simulation suggests that the additional returns delivered over this period as a result of rising real growth expectations have averaged 3.5%.

5. LOOKING TO THE FUTURE

A change of government represents an opportune time to review these historical experiences and to consider what long-term assumptions would be realistic in the present economic and political environment. Will equities continue to be boosted by high dividend pay-outs? Will the sustained re-rating of equities caused by rising real dividend growth expectations be reversed? And what is likely to happen to real rates of interest and inflation expectations?

These are questions which actuaries, in particular, will be addressing carefully in the months ahead as the policies of the new government are implemented and as fiscal changes - the abolition of tax credit payments to pension funds in particular - are digested. It is already clear, however, that equity risk premia as high as 9% pa in future are unrealistic.

Consider what such an assumption implies. Conventional long gilts currently offer a redemption yield of around 7.0%. Long index-linked offer a real rate of return of around 3.5%. The difference between the two - the inflation gap - is 3.5%. Equities need to offer a return of 16.0% if a risk premium over conventional gilts of 9% pa. is sought. This assumes, of course, that conventional gilts are "fairly priced" on a redemption yield of 7.0% and that no marked shift in yields is anticipated.

The return on equities is the sum of the current year's yield - say 4% at present - and future dividend growth. The corporate sector therefore has to deliver long-term nominal dividend growth of 12.0% pa or real dividend growth of at least 8.5% pa, given the implied inflation gap of 3.5% pa. While investors have enjoyed substantial real dividend growth since controls were lifted in 1979, even the most optimistic might find difficulty in arguing that such real growth in future is achievable!

So, what is achievable and what risk premium assumption is realistic? Assume that nominal dividend growth of 5.5% pa is sustainable in the long run, reflecting inflation of approximately 3.0% pa (bearing in mind that it has been assumed that there is a small inflation risk premium contained within the inflation gap) and real growth of 2.5% pa. The latter would be above most actuarial assumptions. Adding this nominal growth rate of 5.5% pa to the current year equity yield of 4% provides an expected equity return of 9.5%. This leads to an implied equity risk premium over conventional gilts of just 2.5%.

6. CONCLUSION

A backward-looking simulation and a forward-looking appraisal of realistic expectations point to the same conclusion. There is no justification for assuming that the historical equity risk premium will be repeated.

It remains to be seen whether, and how quickly, this opinion becomes more widespread. The implications for portfolio investors is that the current asset mix of most long-term funds, particularly pension funds, is likely to be sub-optimal and that careful consideration should be given to lowering the proportion of equities in such funds.

The implication for industrialists is also significant. They should not incorporate the enormous historical risk premium in the cost of capital. They may well then find it appropriate to rein back dividend growth and reduce dividend payout rates over time as many capital projects, which hitherto had failed to breach their cost of capital hurdles, become worthy of consideration.

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APPENDIX

TABLE DEFINITIONS

Table Definitions

N.B. All numerical examples relate to data and calculations for 1960.

Table A

[1] End-year long gilt yield. Source: FT-Actuaries, BZW.

[2] End-year index-linked real rate of return. Source: FT-Actuaries, BZW.

[3] 80% of difference between [1] and [2].

[4] 20% of difference between [1] and [2].

Table B

[1] Implied nominal dividend growth derived from movement in market indices and yields. Source: FT-Actuaries, BZW.

[2] December year-on year changes in Retail Price Index.

[3] Real dividend growth. Derived from [1] and [2]. e.g. 100 x (1.217/1.019 - 1)

[4] Geometric average of annual real dividend growth over previous 10 years.

[5] Data in [4] transformed to fit a distribution with maximum 3.0 and minimum -2.0.

Table C

[1] End-year gross equity market yield. Source: FT-Actuaries, BZW.

[2] (1 + expected nominal dividend growth) where nominal dividend growth is derived from data in column [3] of Table A and column [5] of Table B. e.g. (1.0168) x (1.026071)

[3] Product of [1] and [2].

[4] As derived for [2].

[5] Sum of [3] and [4].

[6] End-year long gilt yield (as in column [1], Table A).

[7] Difference between [5] and [6].

Table D

[1] As derived in column [7], Table C.

[2] As shown in column [2], Table A.

[3] As shown in column [4], Table A.

[4] The normalised real expectation, as derived in column [5], Table B, plus a small adjustment factor. The adjustment factor arises because nominal dividend growth is included in the analysis as ((1+real dividend growth) x (1 + inflation) - 1) and not simply as (real dividend growth + inflation). The adjustment factor is the difference between the two expressions. i.e. (real dividend growth x inflation).

[5] Sum of columns [1] to [4].

[6] As in column [2], Table C.

[7] Column[5]/column[6].

[8]
-[11] Changes in components [1] to [4] where the components are expressed as components of the historic yield [7] by dividing through by the first year dividend growth factor [6].

e.g. Implied risk premium is re-expressed as 3.4258/1.0433 = 3.2836

The change of 1.6085 is the change in this re-expressed figure from the previous year.

[12] Change in total historic yield.

[13]
- [17] Equity market movements implied by changes in yield. Movements are not additive and should be chain-linked.

e.g. ((0.691)(1.008)(0.979)(1.173)-1)= -20%

Table E

[1] Expected equity return at end of previous year, as in column [5], Table C.

[2] Additional return arising from difference between actual nominal dividend growth during year (as in column [1], Table B) and expected nominal dividend growth (as derived in column [2], Table C. The difference affects both the yield and capital appreciation.

[3] Re-rating as in column [17], Table D.

[4] Actual equity return achieved. Sum of [1], [2] and [3]. Figures may differ slightly from total returns quoted elsewhere by authoritative sources. Differences arise mainly because there is no assumed re-investment of income during the year. Figures quoted elsewhere in recent years will also have made use of published xd adjustment figures for the All-Share Index.

[5] Column [4] - column [1].

[6] Redemption yield on long gilts as at end of previous year. As in column [6], Table C.

[7] Actual total return earned on long gilts during year. Source: WM Company, BZW.

[8] Column [7] - column [6].

[9] Implied risk premium at end of previous year. As derived in column [7], Table C.

[10] Difference in equity and gilt returns achieved. Column [4] - column [7].

[11] Column [10] - column [9].