Rates of return for FSA prescribed projections

Report of PricewaterhouseCoopers and peer reviewers' comments

April 2012

Introduction

The Financial Services Authority publishes the enclosed report "Rates of return for FSA prescribed projections" primarily for information. It was prepared for us by PricewaterhouseCoopers and is provided along with the comments of the three peer reviewers we commissioned to provide an independent review of the research.

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PwC's Report

Review of FSA Projection Rates

March 2012

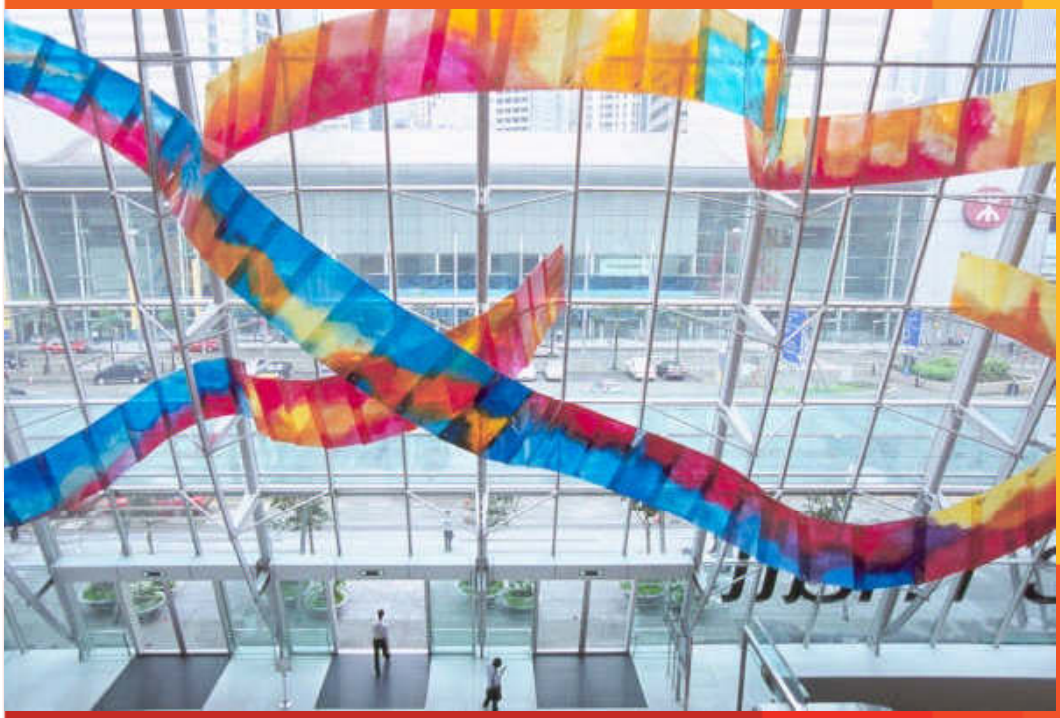

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Table of contents

1 Executive Summary

1.1 Context and application of FSA projection rates

The FSA defines prescribed rates of return that financial services companies must use in their calculations when providing retail customers with projections of future benefits. This must be done as part of the FSA Conduct of Business rules contained in the Conduct of Business Sourcebook ("COBS") in Section 13[1].

COBS projection requirements were introduced to enable consumers to see what return they might get on their investment, to compare product charges, and to see how charges could affect returns, before deciding which product is most appropriate for their needs. Charges are specific to the individual firm or product, but the FSA rules set out the rates of investment return a firm must adopt when making its projection calculations for customers[2].

1.2 Previous reports for the FSA

These rates of return were reviewed in 2003 when we conducted our study "Rates of return for FSA prescribed projections"[3] and subsequently in our 2007 report "Review of FSA Projection Rates"[4] on behalf of the FSA. The 2003 report we prepared for the FSA covered a wide scope, whereas the scope of the update in 2007 was considerably narrower, specifically focusing on the intermediate rates of return assumptions, inflation assumptions (prices and earnings) and validity of the definition of, and differentiation between, taxed and tax-advantaged products.

1.3 Scope of this report

The scope of the current report is broadly similar to the previous report in that it focuses on evolving market conditions, academic research and other factors in determining whether the assumptions used in 2007 to produce the projected intermediate rates are still appropriate and should continue to be used. We therefore review the following components of the intermediate rate of return calculation: price inflation and earnings growth, government and corporate bond returns, equity returns, property returns and the typical mix of asset classes across investment types.

1.4 Key Findings

Our report in 2007 was carried out during a time of relative economic and market stability. The early signs of the credit crunch were emerging, but few economists and market commentators foresaw the dramatic events of 2008/9. Four years later the economic and market environment has changed substantially and this presents us with a number of distinct challenges which were not present in 2007.

At the time of writing this report in early 2012 the economy is operating some way below trend, interest rates are at very low levels by historic standards, and inflation is significantly above the Bank of England target although now falling. Most commentators expect the UK economy will return to trend growth and more normalised interest rates, albeit slowly over a number of years. We have therefore needed to form a view about the short-term outlook for the economy and financial markets, as well as a longer-term view. We treat the

[1] http://www.fsa.gov.uk/pages/Doing/Regulated/newcob/projections/index.shtml

[2] A further rule provides that reduced rates of return must be used if the firm expects these rates to overstate the investment potential of the investment.

[3] http://www.fsa.gov.uk/pubs/other/projection_rates.pdf

[4] http://www.fsa.gov.uk/pubs/other/projection_rates07.pdf

period to 2016 as one in which the economy returns gradually to its long-term trend path following the financial crisis. We then combine projections for the period to 2016 with longer-term trend estimates to provide a medium-term view (for a 10-15 years investment horizon).

1.4.1 GDP

In its March 2012 'Economic and Fiscal Outlook' the OBR projected a trend UK real GDP growth rate of 2.3% per annum by 2015. This includes a 0.2 percentage point increase over OBR March 2011 forecasts owing to methodological changes in the calculation of real GDP growth figures. Calculated on a similar basis to previous figures (i.e. ignoring the methodological change), the estimated trend real growth rate would be around 2.1%. This is lower compared to the previous central estimate of 2.75% for trend growth typically used by the government in the period before the crisis, and the 2.5% estimated used in the late 1990s and early 2000s.

Growth potential may currently be as low as around 1% in the short-term, although in the longer-term we would expect it to recover gradually as credit conditions ease and some of the long-term unemployed are retrained. Over a 10 to 15 year horizon, trend GDP growth of around 2¼%, accounting for the methodological change, is a more realistic figure once we have taken into account the impact of lower growth in the working age population, some of the long-term unemployed not returning to work, lower activity in the financial sector and tighter credit conditions.

1.4.2 Price inflation

CPI has been consistently above the Bank of England target on average over the last 5 years, and most particularly over the past two years, rising to a peak of 5.2% in September 2011. Nonetheless, inflation has fallen quite rapidly in recent months (to 3.4% in February 2012) and is expected to fall further in the near term. The Bank of England continues to target 2% CPI inflation in the medium-term (within a symmetric 1-3% range to allow for short-term fluctuations) and this still tends to be the basis for most medium-term forecasts, including that of the OBR. The long-term average of independent forecasts for CPI inflation remains broadly in line with the Bank of England inflation target and unchanged compared to the estimate used in our 2007 report of 2%. However, owing particularly to changes to the underlying methodology for estimating the RPI index, our medium-term assumption for RPI inflation is substantially higher at 3¼% - an increase of ½% compared to our 2007 report. This is consistent with the evidence from government bond market data[5] and independent economic forecasts. But this is a purely methodological change, not a change in our view of the underlying level of price inflation.

Given the significant effect that recent methodological changes have had on the RPI, and uncertainty as to whether there might be further such changes in the future, we consider that there is a case to use the GDP deflator as a better indicator of the underlying inflation rate in the economy. The GDP deflator is a broader based measure of inflation in the economy which includes housing costs, which makes it more suitable than the CPI for reflecting actual inflation, but is less sensitive to some of the methodological changes that have recently pushed up the RPI. A plausible long-term assumption for growth in the GDP deflator is 2½%, which is also the OBR long-term projection for this measure of inflation and is more consistent with numbers used in past versions of this report[6]. The GDP deflator is also more naturally used in conjunction with estimates of productivity (GDP per worker) growth as a basis for estimating nominal average earnings growth.

[5] For example, long-term averages based on government gilts suggest an RPI estimate close to 3.5%, although these estimates are volatile over time and depend on the maturity of the gilts used. See Section 3 on inflation for more details and some caveats as to how this kind of estimate should be interpreted given potential current gilt market distortions

[6] In the 2007 report we recommended a 2¾% assumption for RPI that would also have been valid for the GDP deflator at the time. Recent methodological changes mean that a 2.5% assumption for the GDP deflator now corresponds to around 2¾% based on the methodology used by ONS at the time of the 2007 report.

1.4.3 Earnings inflation

Since the successful introduction of inflation targeting in 1992, earnings growth, both including and excluding bonuses, has fluctuated around the 4% level. In our previous report in 2007, we recommended an earnings growth estimate of 4¼%. Whilst we expect the long-run earnings growth to be at this level, for this report we recommend a lower average earnings growth estimate of 4% as an average for the next 10-15 years owing to anticipated lower earnings growth in the short-term.

In long-term we consider it reasonable to assume average real earnings growth of 1½% - 2% relative to the GDP deflator based on estimated trend labour productivity growth (GDP per worker). This would still imply nominal earnings growth of between 4% and 4½%, using our central assumption for the GDP deflator of 2½%.

1.4.4 Asset mix

There has been no material change to the mix of asset classes for pension and insurance investment over the past 4 years, other than a slight decline in growth assets holdings in favour of bonds. The main asset class for pension fund investment remains equities, which still comprise on average around 60% of the investment. Insurance products such as with-profits funds now commonly invest anywhere between 50% and 100% in bonds. Unit-linked investments vary enormously in their features and no generalisations can usefully be made. Moreover, pension funds and insurance products have very different asset allocations.

In order to provide an assessment of an overall rate of return for projection purposes, we assume a portfolio with 57% equity, 23% government bonds, 10% property and 10% corporate bonds.

1.4.5 Investment returns

With the fall in interest rates, and the additional downward impact of flight to quality and the Bank of England Quantitative Easing programme, the yields on offer to government bond investors are now at historic lows.

Our analysis of likely returns from government bonds considers the available market evidence, including the current market expectations for a reversal in real yields on government bonds from current negative/low figures. Market data suggests that the current expectation for bond returns is to recover from these historic lows, but the events of the past few years have shown that bond prices can be particularly volatile. Real government bond yields calculated from index-linked government bonds are influenced by the RPI measure of inflation, since RPI is used as the basis of indexing. As set out above we assess real Government bond yields with reference to the GDP deflator measure of inflation. Overall, our analysis suggests that medium-term real returns on government bonds have reduced from 1¾% - 2% in 2007 to ½% - 1%. Additionally, since allocation of fixed interest investment in overseas bond markets is low, and because much of the additional yield available to investors in such bonds is merely to compensate for expected default losses, we do not adjust our expected government bond rate of return for potentially higher returns in overseas government bond investments.

In relation to equities, our analysis suggests that expected returns have declined from a range of 4¾% to 6% to 4% to 5½%. As a consequence of developments in government gilts market and the implications of recent financial volatility, the constituent parts of the return on equity i.e. the risk-free rate and the EMRP may well have moved – the former has decreased whereas the latter has increased compared to our 2007 estimates. While greater equity market volatility could suggest that the required returns should have risen markedly, we have to take into account the returns that are actually available to investors in the market when forming an overall view on the appropriate equity returns and the EMRP. Thus our recommended range for the EMRP of 3½% to 4½% is only slightly higher than that in our 2007 report (3% to 4%) and, when combined with our assumption on government bond yields of ½% to 1%, implies a recommended assumption for the overall real return on equity of 4% to 5½%. When added to an inflation assumption of 2½%, based on the GDP deflator, this leads to a nominal equity return of 6½% to 8%. These returns are lower than those from our 2007 report, reflecting underlying instability in financial markets as well as the weak medium-term outlook for the economy.

Gi lar to UK returns, we consider the 4% to 5½% figure to be suitable for overseas as well as UK equity investments (indeed integrating global capital markets would suggest a similar figure should be used across developed markets).

Our analysis of corporate bonds suggests an expected return above UK government gilts ranging between 1% and 2%. This is an increase on our assessment in 2007 (where the uplift above government bonds was ¾% - 1%), but this is largely as a consequence of very low government bond yields, and not due to higher absolute returns being available for this asset class. The overall real returns on corporate bonds range from 1½% to 3%, which is lower by 1 percentage point at the bottom-end of the range compared to our 2007 report.

Our analysis suggests real expected returns on property could be 3% to 4% - a lower overall real return compared to our 2007 report, largely as a consequence of the low interest rate environment. Property returns are expected to lie between those on corporate bonds and equity.

1.4.6 Tax effects

Our analysis suggests that the reductions in respect of tax from the illustration rates of 5%, 7% and 9% in current use might vary from 0.25% for the lower illustration through 0.48% for the central assumption to 0.76% for the higher illustration. However, it should be noted that asset allocation, rate of churn, rate of return and proportion of return derived from income all have an effect on the tax payable.

1.5 Conclusions and recommendations

Our analysis of the returns in the relevant asset classes leads us to recommend the following assumptions as reasonable central estimates for making projections of retail financial products.

Table 1: Medium-term investment returns assumptions

Recommended assumption	2007 (%)	2011 (%)	Change in percentage points
Inflation: RPI (2007), GDP deflator (2011)	2¾	2½	– ¼
Real government bond returns	1¾ – 2	½ – 1	– 1¼ to – 1
EMRP	3 – 4	3½ – 4½	+ ½
Real equity returns	4¾ – 6	4 – 5½	–¾ to – ½
Real corporate bond returns	2½ – 3	1½ – 3	– 1 to 0
Real property returns	3¾ – 4	3 – 4	–¾ to 0
Nominal government bond returns	4½ – 4¾	3 – 3½	– 1½ to – 1¼
Nominal equity returns	7½ – 8¾	6½ – 8	–1 to – ¾
Nominal corporate bond returns	5¼ – 5¾	4 – 5½	–1¼ to – ¼
Nominal property returns	6½ – 6¾	5½ – 6½	–1 to – ¼

Source: PwC analysis

Note: Nominal returns on government bonds are estimated by adding inflation (RPI in 2007, GDP deflator now) to the real returns on government bonds shown in the table.

Maintaining the approach taken in our 2007 report, these revised assumptions, combined with our assumptions for the current mix of asset classes in typical retail investments, suggest that the intermediate rate of return assumption is lower than that in our 2007 report (6½%) at around 6% per annum.

Although the asset mix on average has remained fairly stable, the decline in projected returns is explained by a combination of factors: (i) expected GDP and earnings growth forecasts are slightly lower, reflecting a weaker outlook for the economy in the short term; (ii) we have used the GDP deflator as an appropriate measure of expected inflation, as opposed to the RPI, and this is lower by ¼% (although this is just a methodological change, not a change in our view on underlying trend inflation); (iii) real government bond yields have fallen by

1% to 1¼% due to flight to quality effects and broader developments in the gilts markets; (i) projected equity returns have declined, but not by as much as expected bond returns; and (v) real returns on corporate bonds and property are lower by 1% and ¾% at the bottom end of their respective ranges – consistent with trends across other asset classes due to broader macro-economic developments.

Lower nominal projection rates, combined with the impact of lower real wage growth, at least in the short term, imply that the future benefits for purchasers of retail financial products could be lower than currently estimated using FSA projection rates.

2 Introduction

2.1 Background

The FSA defines prescribed rates of return that financial services companies must use in their calculations when providing retail customers with projections of future benefits. This must be done as part of the FSA Conduct of Business rules contained in the Conduct of Business Sourcebook ("COBS") in Section 13[7].

COBS projection requirements were introduced to enable consumers to see what return they might get on their investment, to compare product charges, and to see how charges could affect returns, before deciding which product is most appropriate for their needs.

These rules are designed to ensure that projections illustrate appropriate assumptions for the rate of return and to prevent consumers being misled by inappropriately high yields.

A list of the type of products which require prescribed rates of return is presented below:

Box: 1: Examples of FSA regulated retail products which require the use of projections

Taxed Investments

- Endowment policies
- Maximum Investment Plans
- Single Premium Onshore Capital Investment Bonds
- Regular Premium Onshore Whole of Life policies

Tax free (and gross) Investments

- Stocks and Shares Individual Savings Accounts
- Junior Stocks and Shares ISAs
- Friendly Society Tax Free Savings Plans

Pensions vehicles

- Personal Pension plans
- Trustee Investment Plans
- Retirement Annuity Contracts
- S32 Buyout Policies
- Additional Voluntary Contribution arrangements
- Trust based Money Purchase Arrangements (contracted out/in)

These prescribed rates of return were reviewed in our 2007 report "Review of FSA Projection Rates"[8].

In that report we provided a review of:

- point estimates and ranges for real and nominal returns over the medium-term for the major investment asset classes of government bonds, equities, corporate bonds and property;

[7] http://www.fsa.gov.uk/pages/Doing/Regulated/newcob/projections/index.shtml

[8] http://www.fsa.gov.uk/pubs/other/projection_rates07.pdf

- explanations of the underlying drivers of returns for the major asset classes and a summary of the appropriate academic literature;
- an opinion of the appropriate macroeconomic assumptions to be used, such as for wage growth and inflation; and
- an opinion on the impact of taxation on returns generated from taxed and non-tax advantaged products.

Below is a summary of the conclusions on the components used for creating projection rates from our 2007 report. These were based on a combination of macroeconomic analysis, historical analysis of long-run returns and contemporary expectations of future returns.

Table 2.1: Summary of 2007 projected return components

Recommended assumption	2007 rate (%)
Inflation	2¾
Real earnings growth	1½
Nominal earnings growth	4¼
Real government bond returns	1¾ – 2
Real equity returns	4¾ – 6
EMRP	3 – 4
Nominal government bond returns	4½ – 4¾
Nominal equity returns	7½ – 8¾

Source: PwC (2007), "Review of FSA Projection Rates"

These assumptions were then incorporated into a combination of illustrative portfolios in order to assess what the effects of different asset weightings would be on expected returns over the medium-term. Our final estimate was based on a portfolio that was weighted 57% equity, 23% government bonds, 10% corporate bonds and 10% property. Our central projection was a 6.6% nominal portfolio return over the medium-term.

We also reviewed the impact on return for taxed investments (such as unit trusts and endowment policies). In our central estimate, we concluded that the return projections for taxed products should be reduced by 0.8%.

Prior to 2007, the FSA had required a projection of benefits at the lower, intermediate and higher rates of return which were:

- 5%, 7%, 9% for tax-advantaged products (e.g. ISAs and pensions); and
- 4%, 6%, 8% for all other packaged products.

Following our 2007 report, the FSA decided to leave its projection assumptions unchanged at these levels. The FSA continued to base these on assuming price inflation of 2 ½% and average earnings growth of 4%.

2.2 Scope of this report

The remit for this report is laid out in the Terms of Reference (TOR) document entitled "Review of FSA projection rates"[9]. The FSA requires its intermediate projection rates to be reviewed to establish whether they remain appropriate and valid. In particular, this report addresses the following agreed questions:

- Does the current intermediate rate of return continue to represent the appropriate single rate for illustrating potential returns for those products subject to the projection rules?
- Is there reason to doubt the appropriateness of the 1% adjustment for tax-disadvantaged products?

[9] Our Terms of Reference are included in Appendix 1

- Do the long-term inflation assumptions of 2.5% for prices and 4% for earnings continue to be valid?

The scope of the current report is therefore broadly similar to the previous 2007 report in that it focuses on evolving market conditions, academic research and other factors in determining whether the assumptions used to produce the projected intermediate rates are still appropriate and should continue to be used.

We therefore review the following components of the intermediate rate of return calculation: price inflation and earnings growth, government and corporate bond returns, equity returns, property returns and the typical mix of asset classes across these investment types.

2.3 Key principles/conventions

Our approach towards estimating the intermediate rate of return for retail investment products is driven by a number of underlying principles and assumptions. These are set out below:

- **Use of a range around intermediate return:** Our analysis aims to provide an appropriate estimate for the intermediate rate of return for retail investment products. We have considered the available relevant information and methodological tools when forming an overall opinion on a range for appropriate intermediate return assumptions. It is important to stress this range reflects our view of reasonable return expectations that the FSA should consider when determining the appropriate point estimate for intermediate returns. It does not capture the entire range of returns that could be considered in the current market, which would need to consider tail risk and detailed statistical analysis (similar to that undertaken in our report for the FSA in 2003). This is not in the scope of this report.

- **Investment time horizon:** In the 2007 report, we focused on an investment time horizon of around 10-15 years. This timeframe is also used in the current report. We use this to reflect the typical duration of investment illustrations provided to investors, which range from long-term estimates at the point of sale, through to annual shorter-term updates throughout the life of the investment.

- **Longevity of projection assumptions**: While the FSA does not have a set view on when it may review projection rates again, we assume that the FSA would prefer them to be suitable for a number of years. So, unless there is a substantial deviation in macroeconomic or financial market performance, the projection rates should remain valid, but the FSA could decide to re-examine the appropriateness of its projection rate assumptions were extreme events to occur.

- **Use of averages**: In the context of this report, forward looking return expectations across different asset classes represent median estimates. In contrast to mean estimates, investment returns based on the median estimates are typically preferred as they are less distorted by skewed distributions associated with extreme events.

- **Cut-off date:** Unless explicitly stated otherwise, we have used 29/02/2012 as the cut-off date for the data and evidence used in estimating projected returns in this report**.** As the only exception, we do incorporate the revised OBR forecasts, which were published alongside the March 2012 Budget.

- **Data sources:** The data sources used in this report are explicitly stated and are all publically available.

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.4 Challenges in this report

Our report in 2007 was carried out during a time of relative economic and market stability - the very early signs of the credit crunch were emerging, but few economists and market commentators foresaw the dramatic events of 2008/9. This meant that our work focussed upon established methodologies and trends and had a stable historical record to analyse. Four years later the economic and market environment has changed substantially and this presents us with a number of distinct challenges which we did not face in 2007. Table 2.2 below sets out these challenges and the approach we have adopted to reflect these challenges.

Table 2.2: Challenges in preparing this report

C	lenge	Approach
1.	Deviation from steady state or long-run trends. As at 2012 the economy is below trend growth, interest rates are at historically low le land target. Most commentators expect the UK economy will return to trend growth and more normalised interest rates, albeit slowly	Whereas our 2007 report could focus on medium-term trends, in this report we review both the short-term and longer-term outlook for the economy and investment returns. We then combine the two to form a view of appropriate medium-term projections as at 2012.
2.	Movement in risk profile. The risk profile of asset classes has shifted since our 2007 report. For example, equities have become more volatile and government bonds for Euroland countries are now exposed to significant sovereign risk. Increased investment in riskier asset classes, such as commodities and hedge funds have all contributed to a potential increase in risk across a wide range of investment products.	We appraise the intermediate rate of return for investment products currently represented in the market, which means that we follow asset allocation trends. This implies that the average investment – across all asset classes - may have increased in risk. This may have an impact on the thresholds which should be recommended for the intermediate return and communications around the application of projection rates.
3.	Volatility in financial markets. Equity, bond and property markets are substantially more volatile than in 2007.	Financial market volatility means that we have needed to adapt our approach. We have been careful in our interpretation of academic and market data which is not current. We have needed to review consistency when combining sources of market data or studies.
4.	Substantial policy intervention. Policy makers and central banks are now using a wide range of tools to combat financial instability and economic recession. Events are unfolding daily, particularly with regard to the Eurozone sovereign crisis.	We have reviewed the impact of major policy interventions (e.g. Bank of England Quantitative Easing). However, the impact of such abnormal policies and potential introduction of further measures mean that there is additional uncertainty around our projection recommendations compared to 2007.
5.	Tail risk. Separate from an increase in volatility, increased financial market uncertainty since the financial crisis has increased fears of tail risks, or low probability, high impact downside risks, which could be caused, for example, by a major ceasing of financial and banking markets.	We have focussed on the appropriate range for the intermediate rate of return across different assets classes as well as a portfolio of different assets. We take account of the weak economic outlook in setting an appropriate range for intermediate rate of return assumptions, but do not strictly incorporate tail risk. Rather it should be considered in setting the overall range for projected investment returns – i.e. with a low case that more explicitly considers tail risks.

Source: PwC.

Taking challenges 2 to 5 together suggests an increase level of overall investment uncertainty and therefore a greater range around the intermediate rate return. We suggest the FSA take these into consideration when setting the high and low rates, around the intermediate rate of the return.

2.5 Structure of the report

The remainder of the report is organized as follows:

- In **Section 3** we first review the ongoing impact of the financial crisis and then discuss the macroeconomic assumptions concerning the future movements of UK earnings and price inflation over the short and medium-term.

- In **Section 4** we examine the current status of investment portfolio allocations, and how these have changed over time and since our 2007 report. Judging what is a reasonable mix of investment assets is important for setting assumptions as to the range of potential returns available on investment products.

- In **Section 5** we analyse the historic and forward-looking estimates of returns for various major asset classes. We cover government bonds, corporate bonds, equities and property, with a particular focus on government bonds and equities as they account for the large share of most retail investment products. We also provide a commentary on the effects of the financial crisis and continued instability in global capital markets with relation to estimated projection rates.

- In **Section 6** we evaluate the impact of UK tax treatment on income and capital gains for various types of investment products.

- In **Section 7** we present our conclusions and summarise our recommendations concerning the projected rate of return assumptions, inflation assumptions and tax assumptions on estimated investment returns over a 10-15 year period.

3 Macroeconomic assumptions

In this section we first discuss the impact of the global financial crisis and general prospects for the UK economy. We then present our assessment of future UK price and earnings inflation over a 10-15 year time horizon.

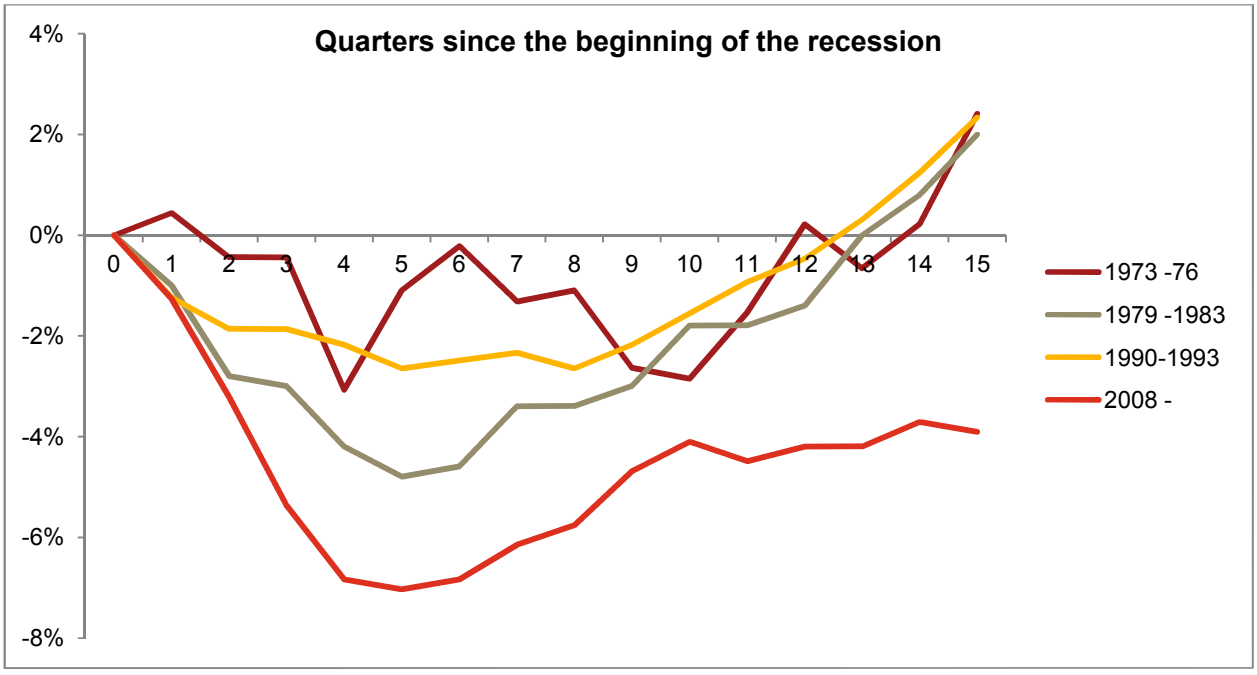
3.1 Economic Background

3.1.1 Impact of the credit crunch and recession

Our last report for the FSA in 2007 predated the problems in the US sub-prime mortgage market which triggered a series of events leading to global recession in 2008-9 and a peak to trough loss in output of around 7%[10] for the UK economy.

The recession of 2008-9 was severe in comparison to previous post-war era recessions and involved far more countries. The recovery in the UK is proceeding at a much slower pace than for the other post-war recessions: Figure 3.1 shows the difference from peak output (GDP) in each period after the downturn began and it is clear how deep and prolonged this current downturn has been (although in the past early GDP growth estimates have been revised up and employment data presents a less bleak picture of the current downturn, so judgements on this are necessarily somewhat provisional). Typically, banking crises result in deeper and longer periods of economic downturn[11], as rebuilding the lending capacity of banks can take a long time and such episodes are often accompanied by other types of crisis - in this case a sovereign debt crisis.

Figure 3.1: Comparison with path of previous UK recessions: % difference from peak output



Source: ONS

Note: First periods of the recessions are: Q3 1973, Q1 1980, Q3 1990, Q2 2008

[10] Office for National Statistics (2011). *Quarterly national accounts: 3rd Quarter 2011.*

[11] "International evidence on recovery from recessions", IMF working paper 09/183, 2009.

The vulnerabilities that the credit crunch exposed in the balance sheets of banks and households have not fully been repaired, and the process of deleveraging is putting a drag on growth as consumers and businesses repair their balance sheets by restricting their consumption and investment, while banks restrict their lending (although how much of this is due to a lack of demand for new loans and how much due to reduced credit supply is hard to estimate with any precision). Confidence is also relatively low, as growth remains subdued and highly uncertain. For example, the 2012 Deloitte CFO survey[12] shows that CFOs are more pessimistic now about taking new risks onto their balance sheets than at any time since 2009. National accounts data show that savings ratios among businesses and consumers have risen since the onset of the recession in early 2008 and remain relatively high more than two years into the recovery. The ongoing sovereign debt crisis in the Eurozone is exacerbating these effects by further adding to the uncertainty and volatility in financial markets and depressing demand in the UK's biggest export market.

In some of the peripheral Eurozone countries, the recession was followed by a sovereign debt crisis although the reasons for this varied across countries. In the case of Greece and Portugal in particular years of fiscal mismanagement left governments heavily indebted and unable to respond to the crisis; with tax revenues falling sharply due to the recession the result was an increase in government debts to levels that were unsustainable in post-crisis market conditions. In Ireland the unsustainable levels of public debt were not caused by fiscal mismanagement prior to the crisis but the decision to bail out the banks following a property crash, leading to a large transfer of debt to the public sector. These governments had to turn to international help from the European Commission, the European Central Bank and the IMF to help finance their debts. In return they embarked on ambitious austerity programmes to cut debt levels. Unfortunately these ongoing programs have so far not brought the rapid return to growth hoped for which is frustrating attempts to bring debt levels down and to calm the markets. Greece has already partially defaulted on its debts and austerity measures are stoking social unrest. An exit by Greece from the Eurozone has been averted in the short-term at the time of writing but remains a future possibility. Whilst the ECB has recently been providing significant additional liquidity to Eurozone banks and action has been taken to bolster the funds available to the European authorities to protect other countries in the event of an exit by Greece or any other country, the potential severity of contagion effects is unknown and thus continues to contribute to nervousness and volatility across markets. The precarious position of the peripheral Eurozone countries will periodically be highlighted as they attempt to refinance debts and thus the negative impact of the crisis on growth is likely to continue into the medium-term even if refinancing is achieved in the short-term.

3.1.2 Outlook for UK economic growth

Medium-term outlook

In the aftermath of the great depression of 1929[13] it took countries on average 10 years for output per capita to return to pre-crisis levels[14], with a sharp contraction in output followed by years of weak growth as banks tried to recapitalize. The UK economy is currently facing similar challenges following the worst global financial crisis since the 1930s.

The near future remains highly uncertain and we should continue to expect volatility as markets react to any signs of recovery or further weakness. Effective policy actions in the Eurozone are crucial, but analysis of economic trends cannot easily predict the outcome of those decisions. The movements of the key macroeconomic variables over the next five years or so will reflect a process of adjustment back to trend and so are likely to differ from long-term trends. Banks, consumers and the government are in the process of repairing their balance sheets meaning that consumption growth and the availability of credit are likely to be lower. The degree to which this needs to take place is not certain and is influenced by the extra risk imposed by uncertainty

[12] Deloitte (2012).*The Deloitte CFO Survey priorities for2012: cash and cost*

[13] Arguably this is the most similar event to the recent crisis owing to its severity and the degree to which it involved countries across the world. The policy response in the recent crisis was better, however, and hence we would not necessarily expect the severity and length of the Great Depression to be repeated in this case.

[14] P236.Reinhart and Rogoff (2009).*This Time is Different: Eight centuries of financial folly.* Princeton University Press

in the Eurozone. The latest edition of the McKinsey Global Institute debt and deleveraging report[15] points to the fact that the debt to income ratio of the UK is very high both compared to historical levels and to other countries and little progress has been made in reducing that debt ratio so far. This implies that more deleveraging will take place but how much is not clear. Debt ratios should be taken in the context of the total balance sheet and households in the UK have far more assets than liabilities. Moreover, net financial wealth is not currently out of line with pre-crisis levels: in 2010 personal liabilities stood at 159% of personal disposable income (PDI), having decreased over the previous two years, according to figures from the Office for National Statistics. Although this figure was still higher than the 139% of PDI in 2003 (a suitable reference year as it was between the Dot-Com crash and current crisis), net financial wealth is actually higher now (270% of PDI) than in 2003 when it was worth 239% of PDI. So whilst some consumers with high debt to asset ratios will be deleveraging as their position has worsened during the crisis, the necessity of deleveraging for the household sector as a whole should not be over-exaggerated[16].

In the banking sector more stringent capital requirements and the damage to balance sheets during the recession have made bank deleveraging a necessity. Considerable progress has been made, but many banks have significant refinancing requirements and funding conditions have been difficult.[17] This is likely to mean lending activity will remain subdued for sometime in a climate of uncertainty and low confidence where the financial system remains vulnerable to further shocks. Low confidence and high uncertainty will also hold back decisions by companies to spend and invest in the medium-term, putting downward pressure on growth.

Table 3.1 below demonstrates the degree of uncertainty about the medium-term future with estimates of 2012 GDP growth by independent forecasters ranging from -0.5% to 1.4%. Looking at later years the range of forecasts becomes even wider for 2013 and 2014, although beyond that most forecasters will just be giving estimates of trend growth rather than estimates for a specific year so the range appears to narrow again somewhat in 2015-16.

Table 3.1: Forecasts for UK GDP growth

% Annual real GDP growth	2012	2013	2014	2015	2016
Average of independent forecasters	0.5	1.8	2.2	2.4	2.3
Range	-0.5 – 1.4	-0.4 - 2.5	0.9 – 2.9	1.7-3.0	1.5-3.1
OBR	0.8	2.0	2.7	3.0	3.0
NIESR	-0.1	2.3	2.8	2.8	2.7

Source: HM. Treasury (February 2012). Forecasts for the UK economy: a comparison of independent forecasts; Office for Budget Responsibility (OBR) (March 2012), Economic and Fiscal Outlook, National Institute Economic Review (February 2012).

Looking at the independent forecasts is instructive; however, we acknowledge the drawbacks to forecasting both due to the tendency of econometric models to be mean reverting and therefore to automatically trend upwards following a recession, and due to the fact that some of the forecasters in the HM Treasury survey use existing forecasts as a reference point meaning that they can be self-referential. Bearing this in mind, it could be argued that risks for these forecasts are to the downside, at least in the short-term given in particular the chance of severe downside scenarios for the outcome of the Eurozone crisis that cannot easily be taken into account in standard economic forecasts models (as acknowledged by the OBR and the Bank of England in their recent forecasting reports).[18]

[15] McKinsey Global Institute (2011). "Debt and deleveraging: The global credit bubble and its economic consequences (Updated analysis)", July.

[16] For example, see the recent speech by Ben Broadbent, External Member of the Monetary Policy Committee, available at: http://www.bankofengland.co.uk/publications/Pages/speeches/2012/553.aspx.

[17] For more discussion of this please see: http://www.bankofengland.co.uk/publications/fsr/2011/fsr30sec2.pdf

[18] PwC, Macroeconomic Outlook, November 2011

Longer-term impact of the crisis

The financial crisis is likely to have an impact on the economy that lasts beyond the next few years. There are a number of factors which are likely to mean lower consumption, investment and ultimately trend GDP growth into the medium- and longer-term. So called 'hysteresis' effects suggest that the economy will not return to the trend growth path it was on before the recession. This is because physical capacity in the economy may have been lost during the recession and because long-term unemployment can cause some people to become detached from the labour force, having lost the skills and motivation that make them employable.

Even after the recovery occurs, it seems likely that credit will be less readily available than prior to 2007. At present as discussed above there is a shortage of credit and, although we expect this to ease gradually as the recovery picks up and banks replenish their capital, a tighter regulatory environment means that, even in the long-term, credit is likely be harder to obtain than prior to the recession. Less liberal access to finance is likely to push up the economy-wide cost of capital and so correspondingly the equilibrium capital-labour ratio will be lower; Barrell and Kirby (2010) [19] estimate that this could lead to a permanent reduction in the level of output per person hour of around 3% compared to the period prior to the recession. This will put downward pressure on growth as investment is less likely to recover to its pre-recession trend. In the longer-term, higher costs of capital may reduce investment in innovation and so put downward pressure on long-term economic growth, although these effects could primarily manifest themselves beyond the 10-15 year time horizon of this report.

Long periods out of work can lead people to become detached from the labour force and these impacts will be permanent for some workers. Ball (2009)[20] argues that the degree to which hysteresis occurs is a function of the time it takes for output to return to its previous trend, with longer periods of weak growth in aggregate demand yielding larger increases in the trend rate in unemployment. Furthermore, deleveraging, particularly in the government and household sectors, will restrict the ability to fund both consumption and investment expenditure during a necessary period of re-balancing. This has been a very deep recession and will take a long time to climb out of as Figure 3.1 shows; we therefore expect a reduction in medium-term trend growth owing to hysteresis.

It is also necessary to take into account a projected reduction in the growth rate of the working age population. Population projections by the ONS show that the growth in the number of 16-64 year olds (the working age population) in the UK will be much slower over the next 25 years than in the recent past (around 0.3% per annum on average as compared to 0.7% between 2005 and 2011)[21] putting downward pressure on trend growth. The OBR's long-term fiscal sustainability report (July 2011) also details other upside and downside risks to long-term growth: Higher migration could boost long-term growth (and vice versa if migration is slower), while further increases in the retirement age (to the extent this is linked to state pension age in practice) would help to offset the effects of a slower growing population of 16-64 year olds.

In its March 2012 'Economic and Fiscal Outlook' the OBR projected a trend UK GDP growth rate of 2.3% by 2014[22]. This includes a 0.2 percentage point increase since the OBR's March 2011 forecasts owing to methodological changes[23] in the calculation of real GDP growth figures. Calculated on a similar basis to previous figures this is 2.1%. This estimate can be compared to the central estimate of 2.75% for trend growth typically used by the previous government in the period before the crisis and the 2.5% trend growth estimate generally used by the Treasury in the late 1990s and early 2000s[24]. Growth potential could currently be as low as around

[19] Barrell, R., Kirby, S. (2011) 'Trend Output and the Output Gap' National Institute Economic Review January 2010 no 215 pp F63-74

[20] Ball, L.M, 2009, 'Hysteresis in unemployment: old and new evidence', NBER Working Paper 14818.

[21] ONS principal 2010-based population projections.

[22] OBR (November 2011), Economic and Fiscal Outlook

[23] Specifically the greater use of CPI rather than RPI as a deflator in calculating real GDP growth. Since CPI inflation is generally lower than RPI inflation, for reasons discussed in Section 3.2 of this report, the OBR estimates this change would reduce measured real GDP growth by around 0.2% per annum on average.

[24] http://archive.treasury.gov.uk/pdf/1999/trendgrowth.pdf

1% in the very short-term, although in the longer-term we would expect it to recover gradually towards the levels projected by the OBR[25] as credit conditions ease and some of the long-term unemployed are retrained.

Over a 10 to 15 year horizon, trend GDP growth of around 2¼%, accounting for the methodological change, seems a realistic assumption to make once account has been taken of the impact of lower growth in the working age population, some of the long-term unemployed not returning to work, lower activity in the financial sector and tighter credit conditions.

3.2 Price inflation

3.2.1 Introduction and summary of recent trends

We recommended in our 2007 report that the most plausible assumptions would be consumer price index (CPI) inflation of 2% and retail price index (RPI) inflation of around 2¾ % on average for the next 10-15 years. This was based on a 2% Bank of England target for CPI and a historical wedge between RPI and CPI of around ¾%. Whilst we expect CPI inflation to return to the 2% target in the medium- to long-term, the RPI-CPI wedge is likely to be higher in future and therefore we recommend using a higher figure for long-run RPI inflation going forward. However, there are considerable uncertainties surrounding any such projections at present, as discussed in more detail below, and there also appears to be a case for paying attention to the GDP deflator as a compromise measure of inflation with a long-term projected value intermediate between CPI and RPI that could give a better estimate of underlying inflation across the economy as a whole

Historic trends

CPI and RPI are both measures of consumer prices, but differ in their method of calculation and composition in ways that tend to make RPI inflation higher on average, as shown in Figure 3.2 and discussed in detail below. Since 2004 the Bank of England has targeted CPI inflation of 2%.

The GDP deflator is a much broader price index than the CPI or RPI as it reflects the prices of all domestically produced goods and services in the economy. As well as consumer prices, the GDP deflator also includes the prices of investment goods, government services and exports, but on some methods of calculation excludes import prices(which is a drawback of using the GDP deflator, but none of these measures of inflation is perfect for all purposes[26]). Unlike the RPI and CPI, the GDP deflator is not calculated by reference to a fixed basket of goods, so its composition continually changes as the economy evolves over time (though the basket to calculate CPI and RPI is also updated each year so this difference should not be overstated).

Table 3.2 below shows averages of these three most common measures of inflation over the last five and ten years. Over the last five years CPI inflation has averaged 3.2%, considerably above the Bank of England target of 2% that has been in place since 2004, although over the last ten years it has been 2.5%. RPI has averaged around 3.4% over the last five years, but has averaged 3.2% over a ten year period. The GDP deflator has been 2.2% on average over the last five years and 2.4% over the last ten years.

In the initial years of the inflation target the Bank of England was successful in meeting its target, bearing in mind the 1-3% range allowed for short-term fluctuations around a longer-term average target of 2%, but since our last report in 2007 price conditions in the economy have become much less benign. This has been a period of high oil prices, increased wholesale gas prices, other global commodity price rises, a significant depreciation of sterling and increases in VAT, all of which have put upward pressure on inflation despite the downward pressure from weak demand in the economy.

[25] We note that in its March 2012 forecast the OBR estimates trend GDP growth to be just 0.8% in 2012, picking up to 2.0% in 2013 and 2.3% in 2014-16 (Table 3.2 on p age 41 of its report).

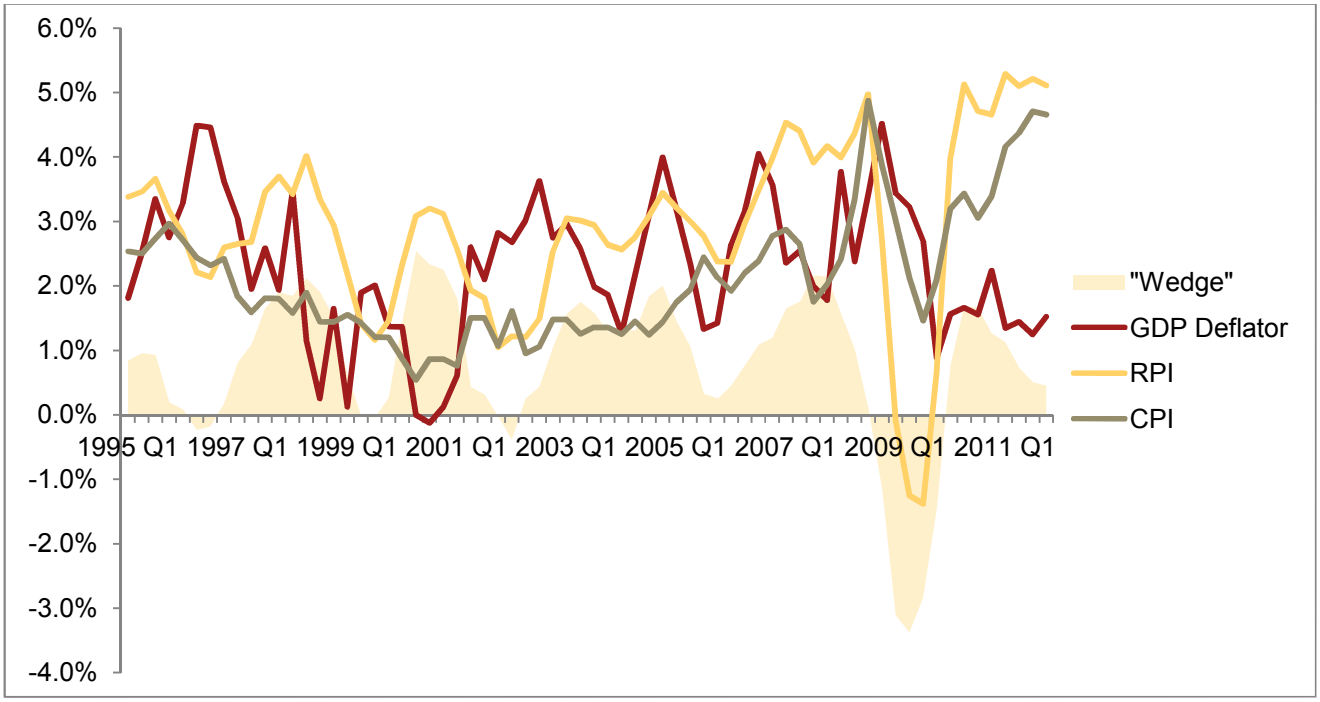
[26] An additional option might be to use the consumer expenditure deflator, but published comparator forecasts are less readily available for this measure and it is also less applicable than the GDP deflator when calculating a benchmark for trend nominal earnings growth with reference to projected long-term GDP per worker growth plus inflation (as discussed later in this section).

Table 3.2: Historic trends in inflation indices

Average inflation (%)	CPI	RPI	GDP Deflator
Q4 2006 – Q4 2011	3.2	3.4	2.2
Q4 2001 – Q4 2011	2.5	3.2	2.4

Source: ONS

Figure 3.2: RPI, CPI, GDP Deflator (% inflation rates) and RPI-CPI "wedge"



Source: ONS

In considering future trends in inflation we need to answer the following three questions:

1. Will CPI inflation return to the 2% target currently set by the Bank of England?
2. What will be the average wedge between RPI and CPI inflation?
3. What is the expected future rate of GDP deflator inflation?

These questions are considered in turn in Sections 3.3, 3.3.1 and 3.3.2 below.

3.3 *Will CPI inflation return to target?*

From the start of 2004 the Government moved the inflation target for which the Bank of England was aiming to 2% on the CPI measure, as compared to 2.5% on the RPIX (RPI excluding mortgage interest) measure. CPI has been considerably above the target on average over the last 5 years, and most particularly over the past two years. It rose to a peak of 5.2% in September 2011 but has since fallen back, reaching 3.4% in February 2012. High commodity prices and the increase in VAT to 20% in January 2011 were both substantial contributors to above target inflation in 2011, but the Bank of England has not raised interest rates in response, taking the view that inflationary pressures will subside within its two year targeting window. As past commodity price increases and the VAT increase drops out of the annual calculation, inflation is falling back and this is expected to continue during 2012, although recent renewed rises in oil prices provide some upside risk to this view. Weak

demand and spare capacity in the economy will also reinforce this downward trend, however, and wage growth remains subdued for the moment as unemployment remains high and tending to rise in the short-term. As and when the economy recovers and the output gap eventually closes, inflationary pressures could build up again as demand increases, but this could be some years away at present.

The Bank of England continues to target 2% CPI inflation and the government has reaffirmed this mandate, so this rate tends to be the basis for most medium-term forecasts of inflation, including that of the OBR. However, the target may not prove easy to hit in more volatile economic times (as compared to the relatively benign pre-2007 environment). There may also be conflict between the Bank of England's primary objective of targeting inflation and its secondary objective of supporting growth in the economy. This has already led to disagreements among MPC members in recent years and we can expect this to continue as the MPC seeks to support growth in the short-term[27] without letting inflation get out of control in the medium-term.

The exchange rate may put some pressure on inflation in the short-term, although the likely impact of this will be dampened by weak demand. Sterling is currently trading at around 1.58 dollars to the pound and 1.18 to the euro (as at February 2012). The exchange rate could be volatile in the short-term, for example because the continuing problems in the Eurozone may make the US dollar a more attractive currency for international investors, in which case one might expect further depreciation of sterling against the dollar. The latest round of Quantitative Easing could also put downward pressure on the sterling exchange rate. Purchasing power indices suggest that the British pound could be undervalued compared to the dollar and the euro, however, which could mean that in the medium-term sterling may tend to appreciate against the dollar and the euro, which would help to control inflationary pressures in the medium-term. Forecasts using the NiGEM model also suggest an appreciation against the dollar of around 5% between Q1 2012 and Q4 2027 and 13% against the euro. But making precise predictions for exchange rates is very difficult or even impossible, and still leaves unresolved the question as to how domestic prices and wages will adjust to any such exchange rate movements. This therefore needs to be recognised as an ongoing uncertainty in any future view of inflation rather than something that can be readily incorporated into projections in a quantitative manner.

We find little reason to suggest that the MPC will pursue in future a deliberate policy of allowing higher inflation in order to reduce debt burdens or to depreciate the pound. Doing so would undermine the credibility of the MPC. Moreover, short-term depreciation will tend only to produce temporary rises in competitiveness and so would not be a particularly effective channel for promoting growth in the medium-term but could just store up inflationary problems for the future. It is likely that in future we will see more volatility in inflation with more frequent periods of cost-push inflation caused by periodic surges in demand for commodities from emerging markets, as well as occasional supply disruptions in the Middle East and elsewhere, which could impair the ability of the MPC to hit its target but may not systematically bias the average inflation rate away from its target even if it increases volatility around the target.

Referring to independent and OBR forecasts as indicators of inflation expectations, the average expectation is that CPI will return to around the 2% target from 2013 onwards after a transitional period in 2012. However, the range of forecasts suggests that risks are somewhat skewed to the upside relative to the 2% target rate (see figures for 2014-16 in the second row in Table 3.3 below). This could reflect service price inflation remaining stubbornly high while global commodity prices remain much stronger than had been the case before the mid-2000s with occasional bursts of exceptionally high commodity price rises arguably likely to be accommodated in part by the MPC in the future as has been the case in recent years, so leading to a ratcheting up of the price level (and so of average inflation rates over time) even if inflation rates eventually return to target after each burst of rapid commodity price inflation. However, quantifying such possibilities is very difficult so in this report we prefer to note this as a risk factor but base our main assumptions on the assumption that the MPC will achieve its CPI inflation target on average for the period beyond 2012 (which is also the OBR and IMF projections as shown in the table below).

[27] Justified with reference to avoiding a future undershoot in the inflation target if growth is unduly low.

Table 3.3: Independent forecasts of CPI inflation

CPI inflation	2012	2013	2014	2015	2016
Average independent forecast	2.6	2.0	2.1	2.2	2.3
Range of forecasts	2.1-4.6	0.7-3.2	1.6-3.1	1.5-3.4	1.7-3.8
OBR	2.8	1.9	1.9	2.0	2.0
NIESR	2.2	1.4	1.6	1.7	1.8
IMF	2.4	2.0	2.0	2.0	2.0

Source: HM. Treasury (February 2012). Forecasts for the UK economy: a comparison of independent forecasts; OBR (March 2012).Economic and Fiscal Outlook; IMF (September 2011) World Economic Outlook, National Institute Economic Review (February 2012).

3.3.1 What will be the wedge between RPI and CPI inflation?

The RPI and the CPI are both measures of the level of prices for goods and services bought by consumers and the rate of change in the indices are therefore measures of consumer price inflation. The differences between the two measures result from coverage and the way the indices are constructed. The RPIX measure used as a target prior to 2004 is very similar to the RPI, except that it excludes mortgage interest payments, but is not used so much now and is therefore not independently discussed below.

The CPI is used by the government for indexing benefits, public sector pensions and tax credits[28]. RPI is used for uprating index linked gilts and revalorization of excise duties. Given that the Bank of England targets CPI, any changes in the RPI-CPI wedge would lead to a permanent change in the likely trend rate of RPI. The GDP deflator is the relevant measure for calculating real output and productivity growth in the economy, which is relevant when it comes to considering benchmarks for average earnings growth. Therefore, we believe the GDP deflator is a better measure of underlying inflation in the economy. Nonetheless, understanding the RPI-CPI wedge is important as some assets are indexed to RPI inflation, and changes in some consumers spending power is better approximated by RPI. There are four main components that account for differences between RPI and CPI:

- **The formula effect:** the CPI uses both the arithmetic and geometric mean to aggregate basic prices, whilst the RPI uses only the arithmetic mean.
- **Housing costs:** RPIX includes housing costs such as owner-occupiers' housing depreciation, council tax, rents and rates. The RPI further includes mortgage interest payments. The CPI currently includes just actual rents (although in future its coverage of housing costs may be expanded).
- **Other differences in coverage:** CPI includes a number of components which are not included in the RPI such as brokerage fees and overseas students' tuition fees. The RPI includes vehicle excise duty, trade union subscriptions and TV licence fees which are not currently included in the CPI. The calculations of car prices also differ between the indices.
- **Differences in weights:** The weights given to the components of each index also vary as different sources of data and different populations are used to construct the weights.

Historically the RPI-CPI wedge has been around 0.75%[29] on average (see Figure 3.2) with most of the positive contribution to the wedge arising from the formula effect (around 0.5%) and the remainder due largely to housing cost effects. Subsequent to the financial crisis and the bursting of the housing bubble, however, house prices fell considerably as did mortgage interest rates from October 2008. This in turn meant that the RPI-CPI wedge turned negative in 2009; although it has now returned to positive territory as earlier sharp mortgage rate falls in late 2008 and early 2009 dropped out of the 12 month calculation for RPI.

[28] Until recently public service pensions were indexed using RPI, but the switch to the CPI, which came into effect in April 2011, was announced by Chancellor George Osborne in the June 2010 emergency budget.

[29] In principle, this represents percentage points; however, for simplicity of presentation we use percentages (%).

In Appendix B, we discuss the future outlook for each component of the CPI-RPI wedge, making reference to a recent detailed OBR working paper on this topic published alongside the Autumn Statement on 29th November 2011. The OBR paper concluded that the RPI-CPI wedge would average around 1.4% over the medium-term. Given an assumption of 2% for CPI inflation this equates to a figure of 3.4 % for RPI in the medium- to long-term, which is also broadly in line with medium-term independent forecasts for RPI inflation as shown in Table 3.4 below. In the short-term, however, whilst mortgage interest rates remain very low and house prices remain subdued, the wedge is likely to be smaller (as it is at present). Like the OBR we assume that in the longer-term house prices will grow in line with average earnings, however, given that our long-term assumption for earnings and house prices growth are lower (4¼% compared to 4.7%) this implies a lower contribution to the wedge from housing in our estimate compared to the OBR in the long run. Our real house price growth assumption is in line with independent assumptions such as the 1-2% estimate suggested by Barrell, K (2010)[30].

Table 3.4: Independent forecasts for RPI inflation and RPI-CPI wedge

		2012	2013	2014	2015	2016
Independent forecasts	RPI	3.2	2.6	2.9	3.3	3.7
	RPI - CPI Wedge	0.6	0.6	0.8	1.1	1.4
OBR	RPI	3.2	2.4	2.5	3.7	4.0
	RPI - CPI Wedge	0.4	0.5	0.6	1.7	2.0
NIESR	RPI	3.5	1.7	1.9	2.7	3.2
	RPI - CPI Wedge	1.3	0.3	0.3	1.0	1.4

Source: HM. Treasury (February 2012). Forecasts for the UK economy: a comparison of independent forecasts; OBR (March 2012).Economic and Fiscal Outlook; National Institute Economic Review (February 2012).

3.3.2 What is expected future GDP deflator inflation?

The size of the CPI/RPI wedge is uncertain and may be subject to further methodological changes in its calculation. For this reason there is a case for using the GDP deflator as a potentially more stable indicator of inflation in the economy that also has broadly coverage than either CPI or RPI. The GDP deflator includes housing costs unlike the CPI, but is not affected to the same degree by the methodological changes that have somewhat artificially inflated the RPI over the past two years through an increased formula effect. The GDP deflator also links naturally to national accounts-based measures of labour productivity growth in order to produce estimates of nominal average earnings growth and nominal rates of return that can be cross-checked against estimates of nominal GDP growth. We therefore make use of the GDP deflator in this report as a potentially more representative measure of inflation in the economy than either RPI or CPI at present. This is not to say the GDP deflator is perfect, notably because it can be subject to historic data revisions and methodological changes itself, but at the present it has some attractions as a compromise measure with a projected medium-to long-term value intermediate between CPI and RPI as explained further below.

Prior to the crisis the GDP deflator tracked at around 0.5 percentage points higher than CPI inflation. We find this result if we look at the period between 1997 and 2007 and between 2004, when the move to a CPI target was made, and 2007. The collapse in house prices (not included in the CPI) and high commodity prices (higher influence on the CPI) have led the GDP deflator to drop below the CPI since the beginning of the recession, but we regard this as a deviation from trend and as inflation stabilises over the next year we expect to see the positive CPI-GDP deflator wedge to return from 2013 onwards. The wedge between CPI and the GDP deflator is not affected materially by the methodological changes that have expanded the formula effect in the RPI – CPI wedge over the past two years and makes the RPI relatively hard to predict in future. Therefore an assumption that the GDP deflator will continue to be ½% higher than CPI in the long-run seems plausible and is also in line

[30] Barrell, R., Kirby, S. and Whitworth R., (2011) 'Real House Prices in the UK', National Institute Economic Review, April 2010, no 216, pages F62-8.

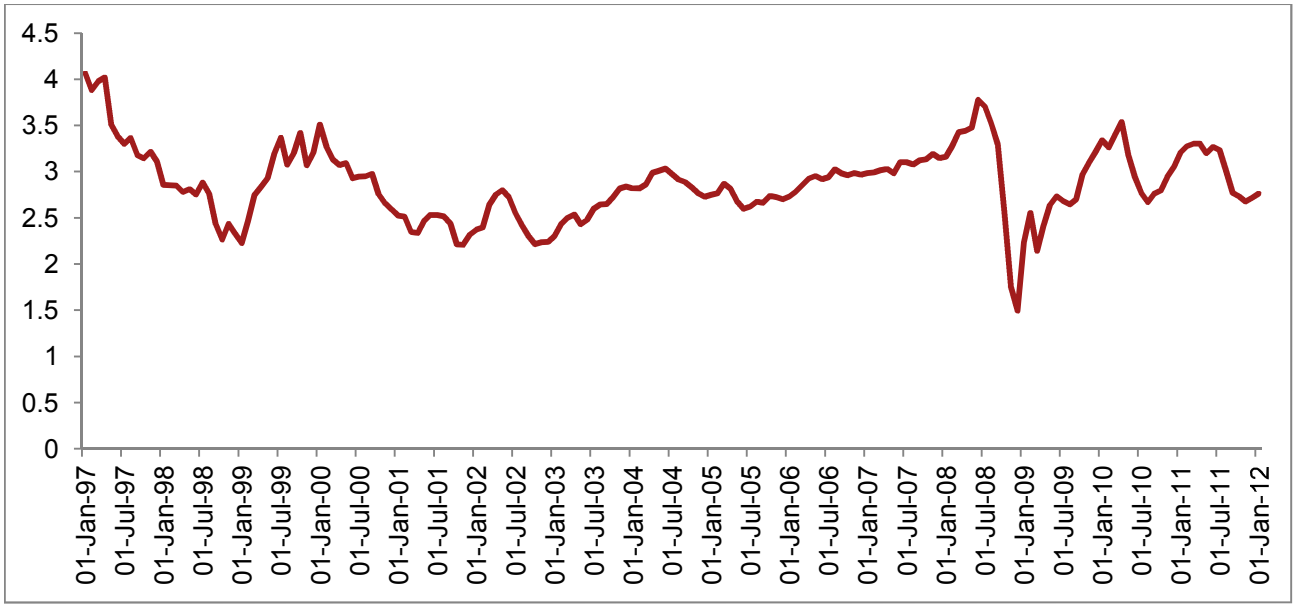
with the OBR's current forecast for 2013-16. Table 3.5 further below outlines the OBR projections for the GDP deflator, which trend to a rate of 2½% in the medium to long-term.

3.3.3 Implied inflation from bond yields

Another way of determining expectations of future RPI inflation is by examining the difference in yields between nominal and index-linked government bonds. The yields on index-linked government bonds are adjusted for inflation using the RPI such that they provide a real yield. By applying the Fisher relationship, the implied level of average future inflation can be determined by dividing the nominal yield by index-linked "real" ld on bonds of the same duration[31]. However, the difference in indexed and non-indexed bond yields may reflect things other than inflation expectations so care needs to be taken in its interpretation.

Figure 3.3 shows the gap between nominal and real yields for 10 year UK government securities, which has been relatively volatile since the beginning of 2008. Over the year to January 2012, however, the average has been around 3.1% for 10 year maturities and around 3.6% for 20 year maturities. Taking averages over a year seems more likely to be representative than the latest spot value given recent high levels of gilt market volatility following the financial crisis and the commencement of the UK quantitative easing programme in March 2009.

Figure 3.3: Implied RPI inflation from 10 year UK government bonds



Source: Bank of England

If we did look at spot rates, RPI inflation of 2.7% over the next 10 years, as implied by current gilt yields, is clearly below forecasters' estimates of RPI, but there could be various possible explanations for this:

- It is possible that markets do not fully believe that the RPI –CPI wedge will remain as suggested by the ONS. Using the old estimate of the wedge of 0.75%, the implied inflation rate of 2.7% is broadly consistent with a 2% CPI target.

- The Bank of England's quantitative easing program has not targeted index-linked government bonds[32]. Bank of England research suggests the purchases of non index-linked bonds pushed yields downwards

[31] See "Notes on the Bank Of England UK Yield Curves", Bank of England, 2002, for more details. Available online at http://www.bankofengland.co.uk/statistics/yieldcurve/notes%20on%20the%20bofe%20uk%20yield%20curvesV2.pdf.

[32] See Bank of England Quarterly Bulletin Q3 2011, "The United Kingdom's quantitative easing policy: design operation and impact".

with little effect on the yield of index-linked bonds. Hence the gap between the real and nominal bonds may not reflect inflation expectations.

- If consumers actually consume the end bundle of goods, then holding RPI indexed bonds with a higher wedge will become more attractive, this would tend to push down the yields on indexed relative to non-indexed bonds, whilst not reflecting a reduced expectation of the RPI-CPI wedge.

- As noted above, the inflation rate implied by gilt yields is volatile with the average over the past year being just over 3% (and around 3 ½% for 20 year gilts), which would be more consistent with independent RPI forecasts.

We consider these points in estimating the RPI-CPI inflation wedge in the medium-term. We feel that the OBR forecasts of March 2012 provide reasonable estimates for RPI, CPI[33] and GDP deflator inflation over the period from 2012 to 2016. Over the subsequent ten year period between 2017 and 2026 an appropriate estimate of future RPI inflation would appear to be around 3¼%, with CPI at the 2% target implying an RPI-CPI wedge of 1¼%. This is slightly lower than the RPI-CPI wedge of 1.4% implied in the OBR working paper on this topic published alongside the Autumn Statement on 29th November 2011 (and covered in more detail in Appendix B). The assumption by the OBR of a 0.5% wedge between the GDP deflator and CPI inflation in the long-run seems reasonable, giving a 2½% trend for the GDP deflator over a 10-15 year time period. These proposed assumptions are summarized in Table 3.7 below. We also show plausible ranges for the medium-term assumptions to reflect the considerable uncertainties that exist.

Table 3.5: Proposed price inflation assumptions (% per annum)

%	2012	2013	2014	2015	2016	2017-2026 (range)
RPI	3.2	2.4	2.5	3.7	4.0	3.25 (2.5-4)
CPI	2.8	1.9	1.9	2.0	2.0	2 (1-3)
GDP deflator	2.5	2.5	2.5	2.5	2.5	2.5 (1.5-3.5)

Source: OBR (March 2012) for 2012-16, PwC estimates for 2017-26

3.4 Earnings growth

Following analysis of historical trends we concluded in our 2007 report that 1½ % growth in real average earnings (relative to both RPI and the GDP deflator) and nominal growth of around 4¼% were the most appropriate assumptions to use. This was broadly in line with average earnings growth over the previous economic cycle (as identified by the Treasury) between 1997 and 2006.

Over the period since the beginning of 2007, however, growth in nominal earnings has been considerably lower than over the period between the beginning of 2001 and the end of 2006 (see Table 3.6 and Figure 3.4 below). The recession has created substantial spare capacity in the labour market, which has kept earnings pressure down. As and when the economy recovers and the output gap closes, we expect there to be more upward pressure, although this is likely to be a very slow process, perhaps beginning from 2013 or 2014. Trend earnings growth will be higher than the growth rates we are seeing now, but we need to consider whether there are good reasons for thinking it may be different from what we suggested in previous reports for the FSA. In the long-run the rate of earnings growth depends on conditions in the labour market and productivity growth as discussed further below.

[33] For CPI inflation there may arguably be some upside skew to the risks around the OBR forecast over the next few years, but it still seems appropriate to anchor the main assumption to the 2% target rate from 2014 onwards.

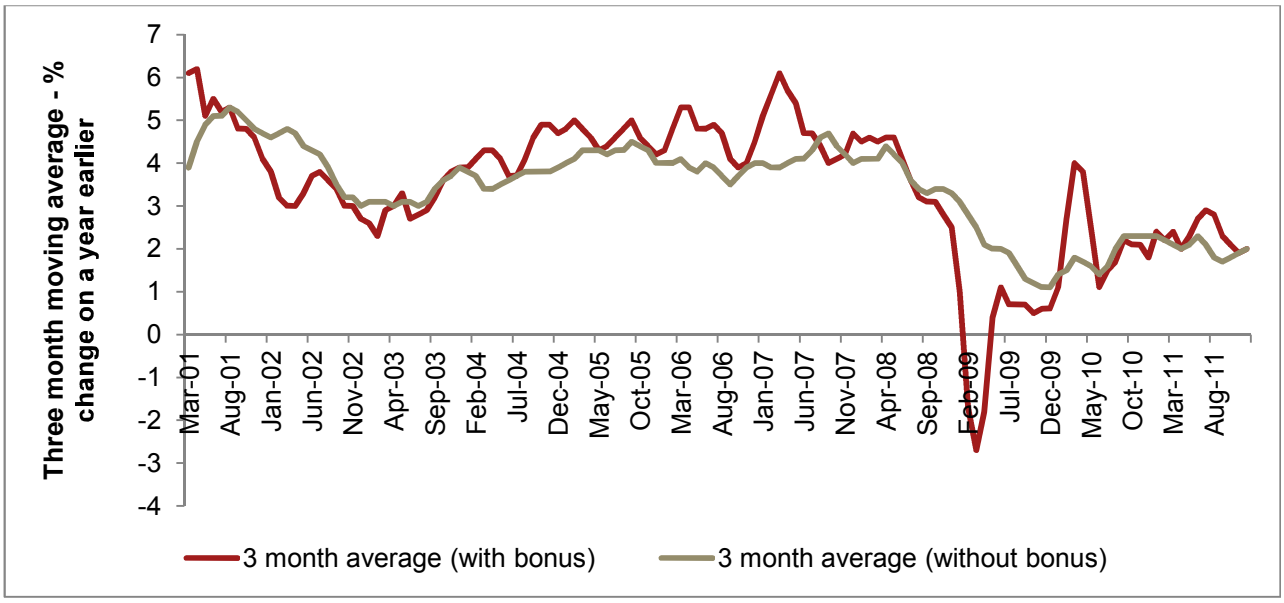
Table 3.6: Historical annual earnings growth (% change: 3 month average on average of the same three months in the previous year)

Average growth in average weekly earnings (nominal)	Earnings with bonus	Earnings without bonus
March 2001 - December 2006	4.1	4.0
January 2007 – December 2011	2.6	2.7

Source: ONS

Note: March 2001 is the earliest point in the AWE series for 3 month year on year average, arithmetic averages are presented

Figure 3.4: Average weekly earnings growth



Source: ONS

Labour market conditions

At present the rate of unemployment is 8.4% (October - December 2011)[34], which is well above its estimated long-term equilibrium rate (the so called 'non-accelerating inflation rate of unemployment' or NAIRU). The equilibrium level of unemployment is probably now around 5.4% according to the OBR's March 2012 forecast, and whilst unemployment remains above this demands for increases in wages are likely to be kept in check. As the economy eventually returns to equili least part of their standard of living lost during the recession, but this seems unlikely over the next few years given the current difficult state of the economy.

In the long-run there may be less downward pressure on wages. The early 2000s were years of significant globalization and technological progress with an increase in offshoring and immigration all tending to put downward pressure on wages of workers in the lower and middle ranges of the income distribution in the UK[35]. This pressure will remain in the medium-term future, although in the coming years an increasing shift of world demand to the emerging economies will cause their wages to rise, hence tending to ease downward pressure on wages in the UK in the long-run. The working age population will also grow at a slower rate, which could reduce downward pressure on wages, particularly if immigration is restricted more than in the past decade in line with current government policy. However these effects are likely to manifest themselves primarily in the longer-

[34] ONS Labour Force Survey data as published on 15 February 2012.

[35] Analysis by the IMF (2007) confirms the significance of these factors in holding down average real earnings growth below the trend rate of labour productivity growth in developed economies over the past two decades. The implication has been a tendency for the labour share of national income to decline gradually over time, albeit with some cyclical variations.

term, including periods beyond the 15 year time horizon of this report. Over the next fifteen years we are likely to continue seeing some restraint in UK wage growth due to these factors, but not as much as in the last decade or so.

Productivity

In the long-run, average real earnings (calculated from nominal earnings growth and using the GDP deflator) might be expected to grow broadly in line with labour productivity, although there will always be large fluctuations in this relationship over time caused by conditions within the labour market as discussed above. In Table 3.7 we observe that real earnings per worker growth (-0.2% since Q3 2007 calculated using the GDP deflator[36]) had a very similar growth rate to output per worker (-0.2% since Q1 2007). The 2001-07 period saw slightly lower growth in real earnings; this was most likely due to the downward pressure on wages from globalization, although we expect some of this pressure to be relieved in the medium- to longer-term as discussed above. However, risks to earnings growth should be considered as weighted to the downside.

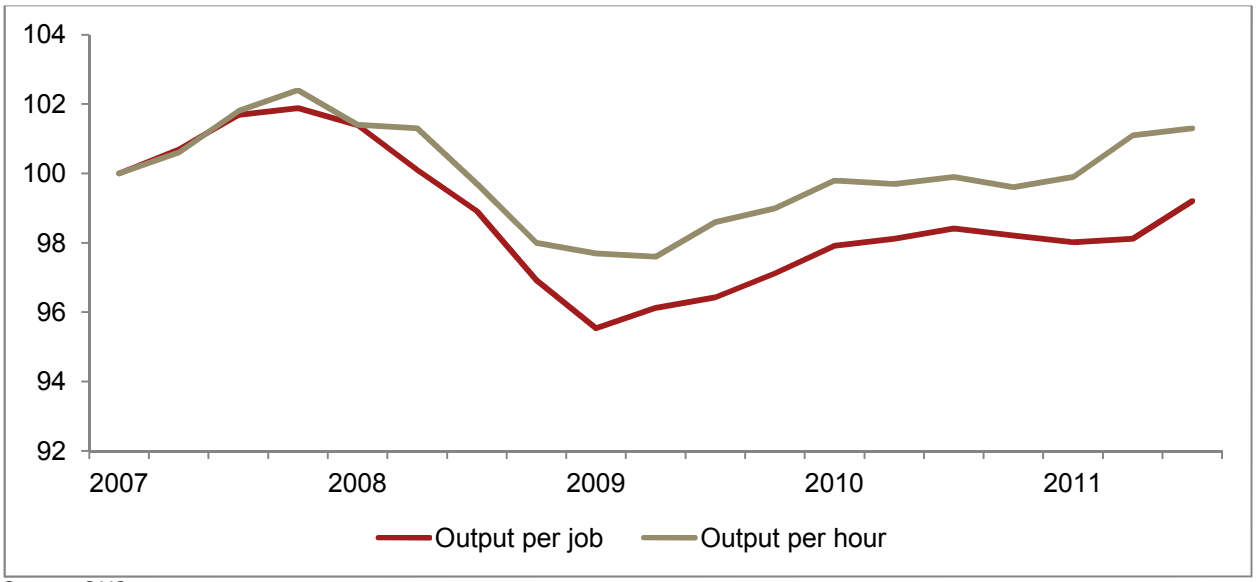
Table 3.7: Comparison of real earnings and labour productivity growth (geometric averages)

Annual average growth	Real earnings (using GDP deflator)	Output per hour	Output per worker
Q3 2001 – Q3 2007	1.5%	2.3%	2.0%
Q3 2007 – Q3 2011	-0.2%	-0.1%	-0.2%

Source: ONS

At the beginning of the recession it appears that firms held on to workers as output plummeted, resulting in significant reductions in measured productivity (Figure 3.5). It is always possible that this could be misleading as output is particularly difficult to measure in the services sector and productivity may therefore also be mis-measured, especially in initial national accounts estimates. Nonetheless, these are the best data we have available at present and do point to persistently low productivity growth even after the recession ended in Q3 2009 (see Figure 3.5 – there was an apparent marked rise in output per hour in Q2 2011 due to fewer hours worked in that quarter, but this may in part be a statistical anomaly relating to the extra bank holiday for the Royal Wedding in that quarter).

Figure 3.5: Productivity indices



Source: ONS

[36] Using the GDP deflator is the most appropriate deflator to use when comparing productivity with earnings as this is the inflation measure applicable to whole economy productivity growth calculations.

Why has productivity growth apparently been so weak relative to the recovery from previous recessions? One possible explanation is that increased credit constraints have held back investment and innovation in firms[37] . As the economy returns to normality we would eventually expect some relaxation of credit constraints, although in the long-term credit conditions are unlikely to be as permissive as in the pre-2007 period as financial regulation will be tighter. Moreover, the financial services sector is unlikely to provide the exceptional gains in productivity that it did in the early part of this century (some of which could themselves have been due to misclassification of temporary capital gains as income). For this reason we expect productivity growth to have a lower long-term trend. Productivity growth of around 1½% – 2% seems a more prudent estimate of trend productivity growth in the period beyond the next few years (when it will most likely be even lower), as opposed to the 2% average productivity growth rate typically assumed by the Treasury before the recession.

Over the period between 2017 and 2026, therefore, we consider it reasonable to assume average real earnings growth of 1½% – 2% relative to the GDP deflator. This would imply nominal earnings growth of between 4% and 4½%, using our central assumption for the GDP deflator of 2½%. With a plausible range for the GDP deflator in the long-run of 2% – 3% this gives a total range of estimates for nominal earnings of 3½% to 5%. In the short-term, we expect real earnings growth to be lower but moving up over the next few years consistent with the OBR forecasts, which appear to provide plausible assumptions for earnings growth for the period from 2012 to 2016, and which is also consistent with our approach to prices. Our recommended assumptions are shown in Table 3.8 below.

Table 3.8: Recommended assumptions for real and nominal UK average earnings growth

% Growth	2012	2013	2014	2015	2016	2017-2026 (range)
Nominal earnings	2.6	3.1	4.3	4.5	4.5	4¼ (3½-5)
Real earnings (relative to GDP deflator)	0.1	0.6	1.8	2.0	2.0	1¾ (1½-2)

Source: OBR forecasts (March 2012) for 2012-16, PwC estimates for 2017-26

3.5 Conclusion: inflation and average earnings growth

The fifteen year average projection for CPI inflation is unchanged from our previous report at 2%. RPI inflation is substantially higher at 3¼% as a result of an increase to the estimated RPI-CPI wedge, but the GDP deflator may provide a better indicator of underlying inflation across the economy as a whole at around 2½ %. Projected average earnings growth is ¼% lower than in 2007 at around 4% on average over the next 10-15 years owing to anticipated lower growth in the short-term. In the long-run beyond 2016 we would expect average earnings growth to be the same as indicated in our 2007 report (i.e. around 4¼%).

As a departure from our previous report for the FSA we set out separate assumptions for the years 2012 to 2016 as the economy returns gradually to a more steady state position following a severe recession and financial crisis, which will clearly take some years. Over this transitional period, the latest OBR forecasts for CPI, RPI, the GDP deflator and average earnings growth seem a reasonable basis for forward projections. Beyond 2016, we recommend a steady state assumption for the following ten year period as in Table 3.9 below, which also shows averages for the whole 15 year period. We can see from Table 3.9 that the 15 year averages for 2012-26 are not materially different from the steady state values and are well within the plausible ranges for the steady state values.

[37] Bank of England, *Agents' summary of business conditions,* November 2011.

Table 3.9: Recommended assumptions for inflation and average earnings growth

% Annual Growth	CPI	RPI	GDP Deflator	Average Earnings
2012	2.8	3.2	2.5	2.6
2013	1.9	2.4	2.5	3.1
2014	1.9	2.5	2.5	4.3
2015	2.0	3.7	2.5	4.5
2016	2.0	4.0	2.5	4.5
2012-16 average	2.1	3.2	2.5	3.9
2017-26 average	2.0	3.25	2.5	4.25
2012-26 average	2.0	3.25	2.5	4.1
Plausible range for Long-term averages beyond 2016	1½ to 2½	2½ to 4	2 to 3	3½ to 5

Source: OBR forecasts (March 2012) for 2012-16, PwC estimates for 2017-26

To avoid spurious accuracy, we would be inclined to summarise our analysis as saying that projected inflation on the broad GDP deflator measure could most reasonably be assumed to be around 2½% on average over the next 10-15 years, with a plausible range of 2-3% for this assumption, while average earnings growth might plausibly be assumed to be around 4% on average over the same 10-15 year projection horizon, with a plausible range of around 3-5%[38] for this assumption. These assumptions would correspond to possible values of real earnings growth of around 1-2% on average over the next 10-15 years and corresponding rates of projected labour productivity growth, allowing for the likely lower levels of such growth over the next few years as the economy adjusts back to trend after the disruptions of the financial crisis. Calculations of financial returns are set to be consistent with these recommended economic assumptions and ranges.

[38] The lower end of this range is below the 3.5-5% range shown in Table 3.9 for the period beyond 2016 to take account of the somewhat lower average earnings growth expected over the 2012-16 period as compared to the average beyond that period.

4 Asset allocations

4.1 Overview

Projections are made not only on single asset class products, but also on balanced funds, with-profit policies and other policies as noted in Box 1 in section 2.1 above. It is, therefore, important to consider the asset allocation underlying these investment vehicles and, more importantly, the changes in these allocations over time.

In theory the illustrations associated with different products should be tailored in a bespoke manner to the investment classes underlying the product. Indeed, in cases where the projection bases laid down by the FSA overestimate the investment potential of particular products or fund options, firms are explicitly expected to consider the use of lower, more appropriate returns.

We understand that the projections given to customers are intended to be a rough guide to the kind of returns that might be achievable and not over-optimistic in their illustration. As standard projections, they need to reflect typical asset mixes and in particular the general mix of more risky assets (equities, property, etc) compared to lower risk assets (especially bonds), whilst recognising that this may vary considerably from regulated firm to firm.

Increasing diversity in terms of asset classes available for investment (e.g. commodities within absolute return or diversified growth funds) has had some impact on investment decisions; however, experience indicates that behavioural changes around these have not significantly impacted the retail options selected.

Given the wide variety of products on offer to customers, it is our opinion that greater and more detailed analysis of the individual mix of assets underlying a product would provide little marginal benefit in deriving a generic broad guide to future returns. In particular, we have not looked explicitly at unit-linked investments due to the extremely diverse nature of the underlying asset classes.

Existing standard illustration bases distinguish between types of product as opposed to underlying investment exposures and for this reason we devote our discussion in this section to the way in which portfolio distributions have changed over time. This allows us to form a judgement as to whether there should be any changes to the "reasonable" mix of risk-free and risky assets for the purpose of setting assumptions which might be used to inform consumers as to the potential ranges of returns available on an investment product.

4.2 Balanced funds

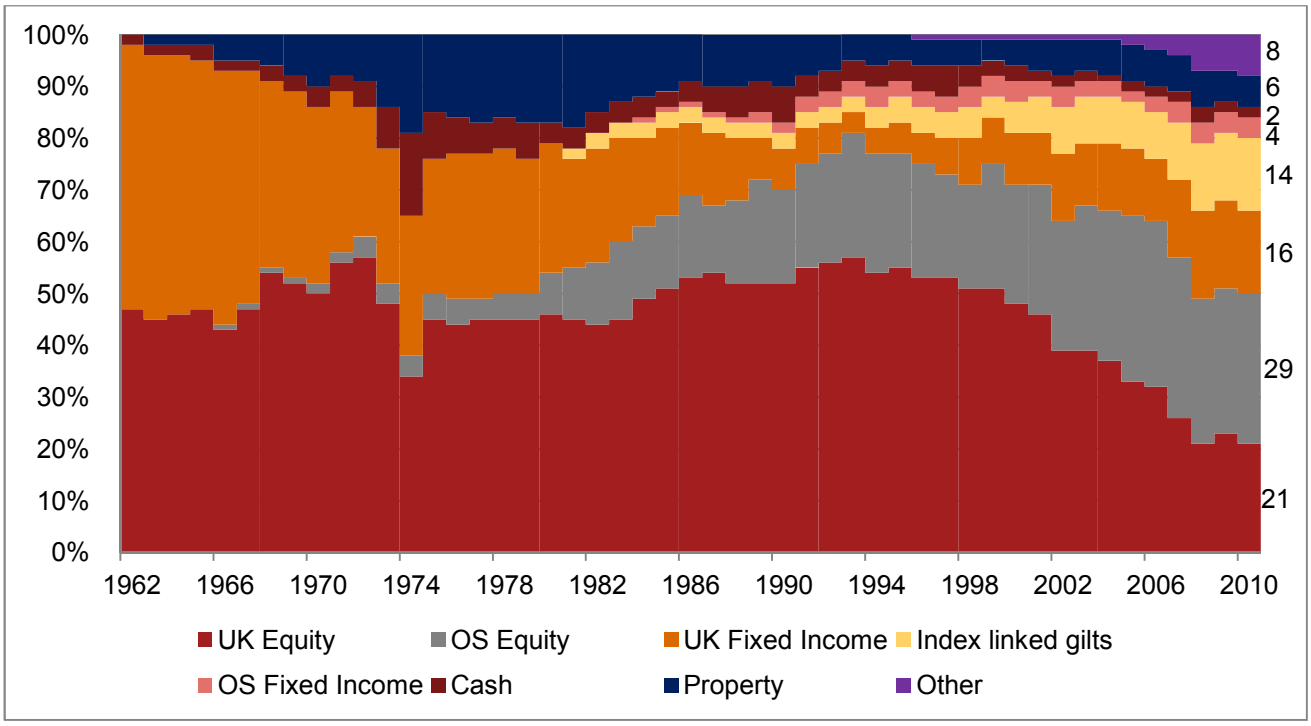
In order to gauge the change in asset allocations for pooled funds, we have used the asset allocation figures provided in UBS Asset Management's Pension Fund Indicators 2011, as well as other publicly available survey data. Most of the available data relates to institutional investors - equivalent data for retail investors is not so readily available, and there is a very wide range of investment styles for balanced managed retail funds. This means that there are bound to be many funds with very different asset allocations from any "median" fund. The trend in with-profits allocation is also considered in the next section.

Experience with the increasing levels of defined contribution and personal pension provision has led providers to attempt to mirror, in the products offered to investors, the sorts of risk undertaken in the past by the trustees of sponsoring employer schemes. Thus, a high level of equity investment has generally been encouraged for those investing early in life, with options for gradual conversion to bonds as retirement approaches (so called "life styling"). The experience of institutional funds over the past few years should therefore provide a reasonable indication of the types of exposure to markets likely to be experienced by retail investors in future. However, while it is important to recognise the much wider range of investment choices available through

defined contribution and stakeholder pensions, we look at asset allocations within balanced managed funds as a proxy for the exposure of the average individual investor. As noted above, due to the prevalence of "lifestyling", this profile will differ between those further from retirement (where a higher return-seeking proportion may be more appropriate) and those closer to retirement (where an entirely de-risked portfolio may be held). The use of broad institutional funds is designed to help strike a balance, as the demographic profile of those served by these funds may be broadly similar to the wider population.

An important feature of the UBS data is its long history, going back to 1962, which gives a better indication of asset allocation trends over time. A chart of the data is shown in Figure 4.1 below.

Figure 4.1: The average asset allocation of UK pension schemes



Source: UBS, Asset Management's Pension Fund Indicators (2011). 2011 figures provided on right hand side.

There are a number of interesting features in this chart. First, the trend for equity investment diversifying from UK equities to a mixture of UK and overseas stock has been maintained, with over 50% of equity funds comprising overseas investments. The trend towards overseas equity investment, in spite of additional currency risk, is driven both by the desire to diversify equity holdings and by increasing opportunities due to increased transparency in emerging markets and opening up to foreign investment.

In 2011, around 50% of the investments of the average pension scheme were in equities, compared to almost 60% in 2007. Although equity investment appears to have declined over the last few years, recent falls in equity markets are likely to have contributed significantly to this change, as long-term investment portfolios are not as regularly rebalanced as other portfolios. Given the movement in benchmark indices, most, if not all, of the movement in asset allocation could be attributed to market movements rather than a trend towards de-risking.

The proportion of property held has decreased over the last 25 years. After rising to almost 20% of the average portfolio in the 1980s, property now makes up approximately 5% of the average pension scheme. This proportion has remained stable over the past 5 years.

Similarly, investment in fixed interest investments has remained stable over the last 5 years. Since equities are generally expected to outperform other asset classes in the long-run, high equity asset allocations (of the order

of 60% to 70%) can be expected to continue for pension schemes as long-term investments. This is particularly prevalent where the liabilities are less significant in relation to the size of the sponsoring employer.

"Other" investments, such as commodities and derivatives, have been adopted by many larger schemes as a method of minimising volatility and enhancing diversified returns. Indeed, corresponding with the decline in equity investment, there has been a doubling of allocation to alternative asset classes since 2007, from 4% to 8% in 2011.

Managed funds have followed this approach, with the major retail pension funds offered by the larger life insurance companies typically having between 70% and 90% invested in equities. Those investors with lifestyle options or those advised to follow a similar course themselves tend to invest greater proportions in bonds as their retirement approaches. As noted above, lifestyle profiles are not necessarily relevant given that we are looking to reflect an overall, average profile across a demographic group. Rates of return intended to mimic the kind of mix of assets in which policies are invested need to reflect this choice, as well as the initial fund mix at the time of investment.

4.3 With-profits funds

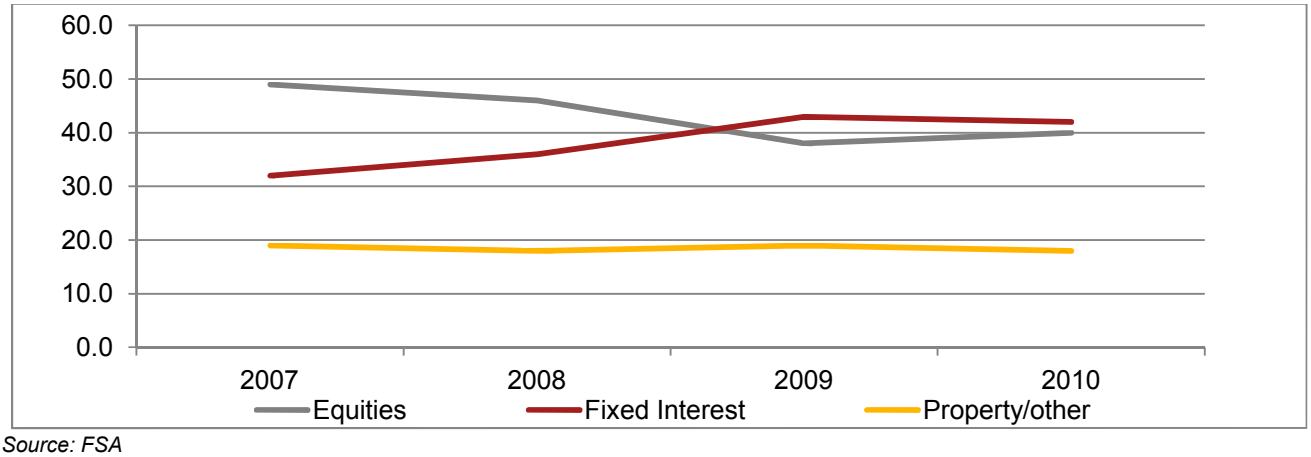
The other major source of multi-asset returns for retail investors is that of with-profits policies. There are several complicating factors here, including the fact that returns are smoothed over time; the extent to which an insurance company's free assets are available to augment returns; the contribution to returns of profits from annuity and other non-profit business; and the cost of guarantees. However, the underly
-profits policy is determined by the returns on the underlying assets.

Unlike that of balanced funds, the asset allocation of with-profits funds is determined by factors other than the desire to maximise returns. In particular, the expectations of policyholders are that the portfolio would be a mixture of asset classes with, in general, a majority of the investment in equity and property. However, if the level of free assets in the fund is reduced, solvency considerations require a higher proportion of fixed interest investments.

For open with-profits funds there is a need to illustrate both new business and annual renewals. Many with-profits funds have closed to new business, some of which have rebalanced their portfolios to a more cautious strategy to avoid solvency risk. Where the asset mix makes the standard rate of return projections inappropriate, providers are required to use appropriate rates. We have not sought to build these funds into our analysis.

In order to show the asset allocations applicable to investors, we show in Figure 4.2 below the summary of the proportion of bonds, equities and property/other in major UK life insurance companies with-profits funds over the period since 2007.

Figure 4.2: Proportion of bonds, equities and property in UK life insurance companies



Source: FSA

Our previous report indicated a split of investments stabilising at 40% in equities, 40% in bonds, 10% in property and 10% in other assets. The market volatility noted above has obviously influenced this, but there is no indication from the data of any strategic shift in the assets held in with-profits policies.

There is a wide spectrum of investments for with-profits offices. At one end, perfect matching in gilts will virtually guarantee the return; at the other, there is still a relatively significant proportion of equities. However, even for these, it might well be imprudent to specify an equity investment component of more than 50% when calculating the expected return, although it is the possible that some of the funds invested will choose to use their own lower projection rate.

4.4 Conclusion: Asset mix

The key points made in this section are:

- Pension funds and insurance products have very different asset allocations.
- There has been no material change to asset mixes over the past 4 years, other than a slight decline in growth assets holdings in favour of bonds (which is more pronounced in life funds).
- The main asset class for pension fund investment remains equities, which still comprise on average around 60% of the investment.
- Insurance products such as with-profits funds now commonly invest anywhere between 50% and 100% in bonds.
- Given relatively small changes in asset allocation since 2007, we retain the portfolio compositions used in our previous report for estimating intermediate rates of return. This includes a blended portfolio consisting of 2/3 equity and 1/3 government bonds. We also show aggregate returns using a portfolio of 57% equities, 33% government bonds and 10% property and a portfolio of 57% to equities, 23% to government bonds and 10% each to property and corporate bonds. The 57% allocation to equities reflects evidence across life insurance companies and pension funds (among others), giving relatively greater weight to pension funds in forming an overall position on the appropriate equity allocation in the blended portfolio.
- We also include a portfolio of 50% in equities with 30% in government bonds with 10% in both corporate bonds and property. This is to show the potential impact of a shift towards fixed income investments away from equities.

5 Investment returns

In this Section we set out historical returns for individual asset classes, as well as review the most recent academic literature on the appropriate approaches for estimating future expected returns. We analyse the impact of the financial crisis on the returns across different assets classes and provide an assessment of the intermediate rate of return projections for assets classes included within retail investment products.

The analysis presented in this report updates our previous analysis for the FSA in 2007. Our overall approach is broadly the same, but we take into account current market developments across different asset classes which affect long-term return expectations. Where appropriate, we refer to comparable estimates for the relevant asset classes in our 2007 report.

For the purpose of providing an intermediate projection rate across a range of assets, and guided by the asset allocations in Section 4, the asset classes we consider relevant are:

- government bonds;
- equities;
- corporate bonds; and
- property.

These asset classes are unchanged from our report for the FSA in 2007. As noted in Section 4, our understanding suggests that these four asset classes combined represent around 90% of total investment in FSA regulated retail products. Moreover, the key asset classes within balanced funds and with-profits funds are equities, bonds and some property; and this is where we concentrate our review.

As set out in Section 2 we assume a typical investment horizon of 10-15 years. We also briefly comment on investment returns over shorter-term horizons. This is because the term structure of interest rates is likely to mean interest rates will change through the 10-15 year investment period. Our overall approach is shaped by a weighted average across short- to medium-term investment horizons (10-15 years), but nonetheless we do recognise in principle the uncertainty associated with expected returns in relation to different durations of investments.[39]

This section is structured in the following manner:

- Section 5.1 analyses historical government bond returns and forward looking expectations for real returns on government bonds;
- Section 5.2 assesses developments in equity markets, particularly focusing on realised and expected returns on equity investments;
- Section 5.3 reviews the likely returns from corporate bonds;
- Section 5.4 analyses returns in the property sector; and
- Section 5.5 brings together the information from the different sub-sections to provide an overall assessment of the intermediate rate of return projections across different asset classes.

[39] The degrees of uncertainty associated with different durations of investment are set out in paragraph 617 of our 2003 report.

5.1 Government bonds

Government bonds were considered a safe investment with zero (or extremely low) default probability, but the Eurozone sovereign crisis has highlighted that bonds from only the most secure governments can be considered truly risk-free.

In general, nominal yields on governments bonds provide compensation to investors for the following factors:

- **Inter-temporal transfer of funds** – the decision by the investors to delay consumption and instead invest their finances. Since rational investors prefer consumption today as opposed to tomorrow, they require compensation for delaying such consumption;
- **Inflation** – Investors require compensation for inflation over time, in order to ensure the 'real' lue of their investments. Returns on nominal securities typically incorporate compensation for inflation (index-linked bonds provide compensation for inflation through the indexation of the value of the bond);
- **Inflation risk premium** – This represents the risk that outturn inflation might be different from inflation expectations incorporated in the yield on nominal government bonds at the time of purchase;
- **Maturity premium** – In normal market conditions, investors require additional compensation for investments in longer maturity bonds, because they are more exposed to interest rates risk over a longer period. In general, this suggests an upward sloping yield curve, where the yield on longer maturity debt is greater than that on short-term debt;
- **Liquidity premium** – Under constrained market liquidity, investors generally require compensation for liquidity i.e. the inability to translate investment into cash without facing significant transaction costs. In the context of the UK, the liquidity premium for government gilts is likely to be low, and hence will form a small part of the overall yield / return requirements for investors; and
- **Default risk** – Government gilts are usually considered default free, particularly in the case of a country like the UK. However, for some other European countries impacted by the recent sovereign debt crisis, bond yields incorporate some premium for default risk.

In contrast, yield on index-linked gilt securities (or TIPS in the US) provide real returns to investors. In principle, nominal returns are contractually guaranteed, but their real returns are less predictable due to the uncertain impact of inflation. To protect investors from uncertainty in inflation expectations, index-linked bonds offer an inflation-protected real return. Coupon payments on index-linked UK government bonds are indexed to inflation by linking payments to the RPI, and hence the return on these bonds is observable in real terms. As such, they predominantly compensate investors for inter-temporal transfer of funds, although depending on the market dynamics at the time there might be additional compensation for liquidity and maturity risk. Based on the term structure of interest rates, the difference between the nominal and real yields on securities provide estimates for the breakeven inflation rate[40]. The investor return encompasses both the expectations of inflation going forward as well as the inflation risk premium i.e. uncertainty associated with outturn inflation.

There is evidence to suggest that under the scenario where there is a significant difference in liquidity between the index-linked and nominal gilts market, the yield difference between nominal government bonds and index-linked gilts of equal maturities also includes the premium for illiquidity – such that the overall yield differential equals market inflation expectations, the inflation risk premium less the liquidity premium on the index-linked gilts market[41]. To the extent that the inflation risk premium is low[42] and there is no significant liquidity

[40] Haung, J and Grishchenko, O (2009), "Inflation Risk Premium: Evidence from the TIPS Market", August.

[41] BIS Quarterly Review (2008), "The inflation risk premium in the term structure of interest rates", JEL classification: E43, E44, September.

[42] The available empirical evidence on estimates for the inflation risk premium are somewhat mixed, however, recent inflation risk premium estimates tend to be relatively small, albeit positive. Some recent evidence in the Euro area suggests that the inflation risk premium ranges between 25 to 50 basis points – see for example the evidence provided by BIS (above). Additionally, Haung, J and Grishchenko, O (2009), suggest inflation risk premium is time varying and ranges between 11 – 22 basis points for 10 year maturity. The sample period they analysed covers 2000-2007, wherein the inflation risk premium is positive for the more recent past.

premium associated with index-linked gilts, the difference between yields on nominal and index-linked gilts provide a reasonable estimate of the market's inflation expectations going forward.

The yields on index-linked gilt securities are linked to RPI – thus the yield differential between expected real and nominal gilts represents expectations of inflation consistent with the RPI. However, as discussed in section 3 above, the measure of RPI is currently being impacted by a number of factors, including the change in the underlying methodology for calculating the RPI. This is influencing the calculation of future expected real government bond returns and may not be giving a representative measure of the inflation that should be captured in nominal returns across asset classes. Hence, we consider it appropriate to use the GDP deflator as a better measure of economy-wide inflation. Such an approach warrants a different calculation of the future expected real yield on government bonds (but does not impact the expected nominal return on government bonds) and is discussed further in Section 5.1.4. Historical real and nominal returns calculations remain unaffected, as the change in methodology for estimating the RPI is relatively recent.

In the current context, it is important to make a distinction between the gross redemption yield and holding period returns - we are interested in the latter for the purpose of the current analysis. The redemption yield represents the return on the fixed interest security assuming it is held to maturity; however, the actual return might be different if the security is not held to maturity, which is contingent on the capital value at the point of disposal.

Having set out assumptions on inflation, the focus in this Section is on real bond investment returns. In our 2007 report we recommended an assumption for expected real government bond returns of 1¾% –2.0% per annum over the longer-term and 4½% – 4¾% for nominal bonds. We now review developments in government bonds markets in the UK and assess the performance of UK and other international (mostly US) government bonds and provide an updated assumption for expected future returns.

5.1.1 Historic government bond returns

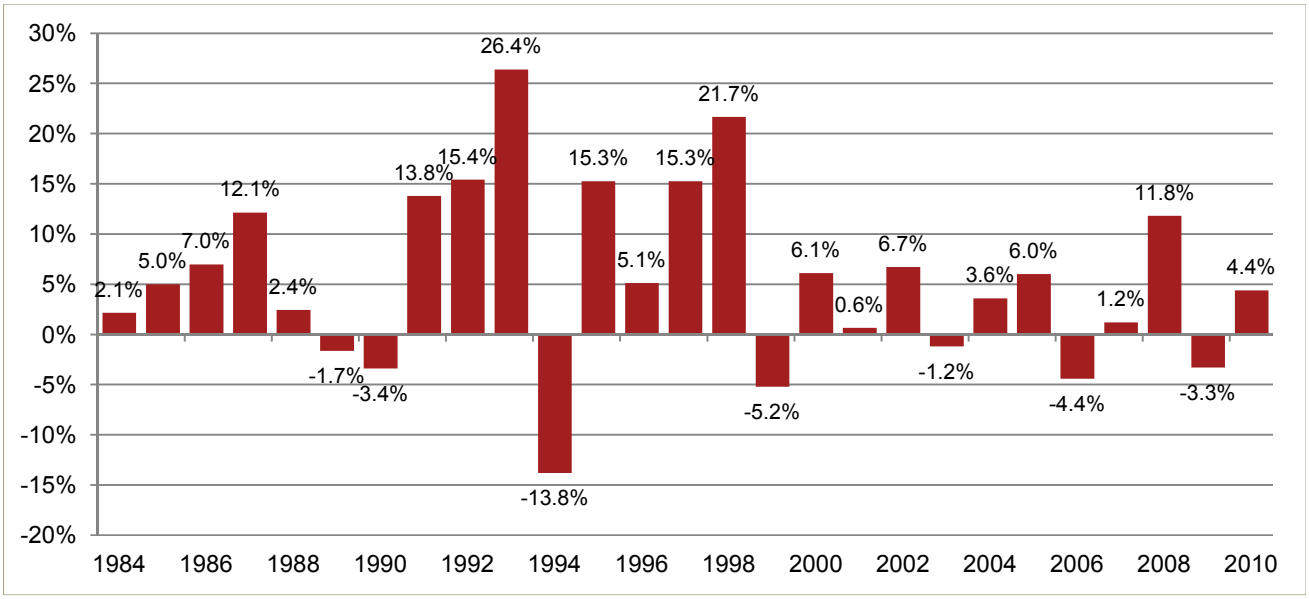
Historical real returns on government bonds can be estimated using nominal bonds, adjusted for inflation, or alternatively can be interpreted directly from index-linked gilt securities. In this sub-section we refer to returns on the former, with the latter covered in the next sub-section. Our analysis is based on the Barclays Equity Gilts Study, which provides a detailed overview of realised returns on UK (and other international) government securities.

Since writing our 2007 report, UK government bonds have generated an average real return of 3.5% per annum over the period 2007 – 2010, based on Barclays Capital data. The comparable estimate for the period between 2003 and 2006, quoted in our 2007 report, was around 1.0%. This suggests a relatively strong performance, which was particularly driven by holding gains in 2008, when the price of bonds rose, as interest rates fell during the financial crisis.

UK government bonds performed relatively poorly in 2009, but the 'flight to quality' in 2010 and continuing into 2011 means that UK government bond returns have continued to perform above longer-term averages.

The performance of US bonds in the same period has also been above historic averages, with annual real returns averaging around 4.6% between 2007 and 2010. Overall, on average, real government bond returns in major international markets (UK and US included) were higher between 2007 to 2010, compared to 2003 to 2006. This helps to demonstrate that a portfolio invested in a mix of bonds and equities would have benefited from above average bond performance at a time of poor equity market performance (as discussed in Section 5.2). Figure 5.1 below shows real annual UK government bond returns since 1984.

Figure 5.1: UK government bond real annual returns



Source: Barclays Capital

Over the longer-term, the real return on UK government bonds, from 1900 to 2010, has been 1.2% per annum which is similar to the 1.3% return between 1900-2006 we quoted in our previous report[43]. Dimson, March and Staunton ("DMS") show that US average real returns were 1.8%[44] over the same period 1900 to 2010 and across the world average real returns were 1.6%. These are similar to the estimates quoted by DMS in our previous report (in 2007) for 1900-2006[45].

5.1.2 Historic index-linked government bond returns

Index-linked government bonds provide the best indication of the real risk-free rate, because they are relatively free of both default risk and inflation risk, as compared to nominal gilts which are exposed to inflation risk. However, some of the other factors identified above, such as maturity risk and liquidity risk might also be relevant for index-linked government bonds[46].

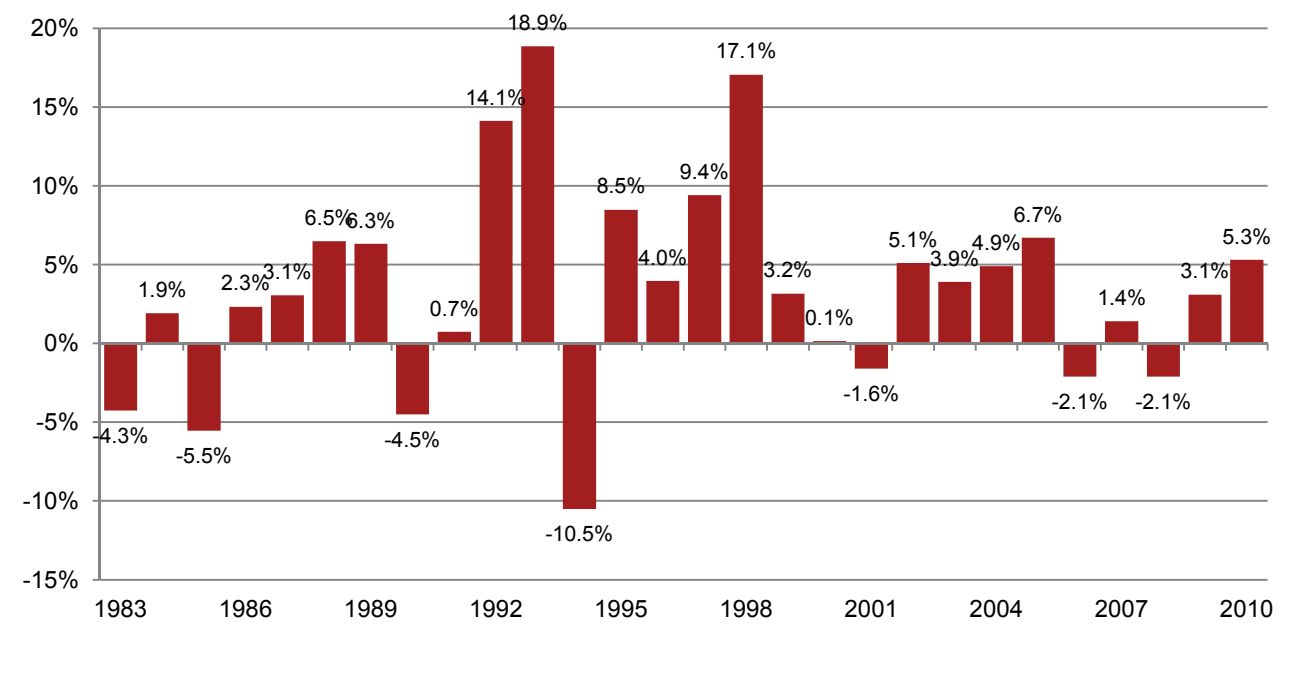
Index-linked government bonds were launched by the UK government in 1981 and therefore lack the same performance history on returns compared to nominal government bonds; nonetheless the realised returns on UK index-linked government bonds reported by Barclays and replicated in Figure 5.2 below provide a useful cross-check on real returns estimated in the previous sub-section.

[43] PwC (2007) "Rates of return for FSA prescribed projection 2007". Note: Nominal returns are deflated using a cost of living index which uses Bank of England inflation data for 1899 to 1914, and thereafter the RPI calculated by the Office of National Statistics (ONS).
[44] "Global investment Returns Yearbook 2011", page 50

[45] US real returns were 1.9%, whereas across the world real returns were 1.6% between 1900-2006.

[46] Index-linked government bonds do not, however, incorporate an inflation risk premium as they are protected from all but a tiny amount of volatility in inflation.

Figure 5.2: UK index-linked government bonds real annual returns



Source: Barclays Capital

Over the period 2007 to 2010, index-linked government bonds achieved an average real annual return of 1.9%. The comparable estimate for the period between 2003 and 2006, was around 3.4%. The variability in index-linked government bond returns results from changes in capital values which are sensitive to the market rate of interest. Index-linked government bonds were launched when interest rates were relatively high, and as interest rates have fallen historically[47], the 10 year real return has benefited from this shift. However, the Bank of England base rate is now at a historically low rate of 0.5%, implying limited upside potential from any changes in the market rate of interest and leading to lower returns in future.

The real return on UK index-linked gilts, from 1990 to 2010, has been 4.3% which is higher than the 2.4% return for the shorter time period of 2000 to 2010.

5.1.3 Implications of recent financial market volatility

Since writing our last report in 2007, there have been fundamental developments in global bonds markets as a consequence of the financial turmoil in 2007/2008 and continuing effects of the Euro sovereign crisis.

The recent financial crisis has had a significant impact on the cost of financing, across both debt and equity capital markets and during the crisis risk premia increased markedly. Moreover, as investor confidence in global corporate debt and equity capital markets eroded, there was a resulting flight to quality from (relatively risky) corporate debt and equity into sovereigns (and top-rated corporate bonds). The direct implication of this was an increase in the prices of government bonds (and high-rated corporates), both nominal and index-linked, across different maturities, which resulted in declining yields. While the corporate sector faced increasing costs of financing during the financial crisis, financially strong governments benefited from lower borrowing costs.

Figure 5.3 below shows the evolution of the nominal yield on UK government bonds and investment grade rated[48] UK corporate bonds of 10-15 year maturity. As the Figure shows, the yield on UK government bonds has gradually declined over time, but since the start of the financial crisis in mid-2007 the yields have been very

[47] The Bank of England base rate fell from above 10% 1983 to 0.5% in March 2009.

[48] Issued bonds are considered investment grade if they are rated BBB- or above by ratings agencies S&P and Fitch or Baa3 by Moody's

volatile. More importantly, they started declining roughly at the same time when the yield on corporates increased markedly – signifying the flight to quality effect. Interestingly, although the yield on (BBB and A rated) corporate bonds increased markedly during the financial crisis, since then they have declined and have returned to pre-crisis levels at around 6.0%. Because of the drop in government bond rates, the spread between corporate bonds and UK government bonds is significantly wider than pre-crisis.

Figure 5.3: UK gilts and corporate bond yields (nominal)

Source: Datastream and PwC calculations

Additionally, the flight to quality effect has been further augmented by the Bank of England's Quantitative Easing (QE) program, which has led to a strong (non-market) source of demand for (largely nominal) government bonds. As part of the quantitative easing program, the Bank of England has been predominantly purchasing government bonds[49], particularly those with medium-term maturities (mostly 5 to 10 year). During the initial phase, between March 2009 and January 2010, the Bank of England purchased £200 billion of assets[50]; however, last year, the Bank of England announced a second round of asset purchases as part of the QE programme, equalling around £75 billion[51]. More recently, the Bank of England further announced its decision to inject an additional £50 billion into the economy – taking the total amount of QE stimulus to £325 billion since the programme was initiated in 2009. In the UK the announcement of the QE programs are expected to have led to a significant decline in yields of long-dated government securities due to the relatively large size of the purchase program (the first phase was equivalent to 14% of total GDP[52]).

The precise impact of the QE programme is difficult to quantify, not least because of the challenges associated with disentangling the concurrent developments in financial markets simultaneously impacting the yield on gilt

[49] See Bank of England Quarterly Bulletin Q3 2011, "The United Kingdom's quantitative easing policy: design operation and impact", page 200.

[50] Ibid. As of 14 December 2011, the Bank of England has purchased roughly £221bn and £2.1bn worth of government and corporate bonds, respectively.

[51] Bank of England news release, 6 October 2011: http://www.bankofengland.co.uk/publications/news/2011/092.htm

[52] See Bank of England Quarterly Bulletin Q3 2011, "The United Kingdom's quantitative easing policy: design operation and impact", abstract.

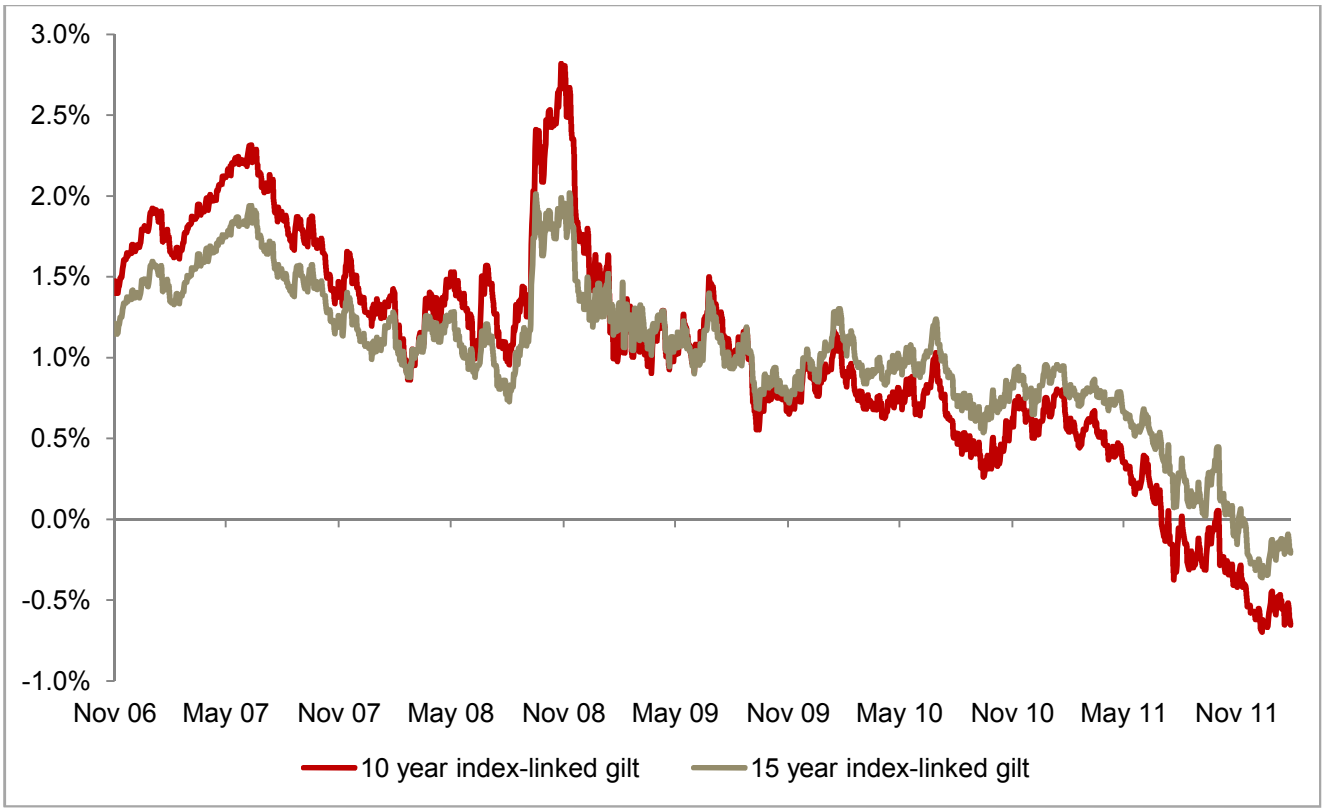
securities. Moreover, asset purchases may also have a stimulatory impact through their broader effects on confidence and by influencing the bank lending channel directly.

The Bank of England's own analysis suggests that the initial QE programme led to a decline in yield on nominal gilts of around 100 basis points, between March 2009 and February 2010[53], directly as a result of the underlying scheme and the resulting portfolio rebalancing. However, a recent study by the Bank of International Settlement (BIS) suggests that the precise impact of the QE programme on the yield of UK gilts is likely to have been less significant. Its analysis indicated that, on average, the first phase of the asset purchase scheme lowered yields by 27 basis points for gilts with a remaining maturity of 5 to 25 years, whereas the most significant impact was on the yields for gilts of about 12 years to maturity, which were reduced by as much as 74 basis points. In the case of the QE programme in the US, the BIS study argues that, on average, it lowered the yield curve by 21 basis points, with a maximum impact of 108 basis points for some securities with remaining maturity of around 20 years[54].

It is unclear at this stage how quickly the impact of QE programmes will unwind, and hence, this questions how reliable the current yields on UK governments bonds are for determining the benchmark rates for the purpose of long-term projections. In absolute terms, however, over the period of the support programs, the initial effect on benchmark yields seemed to wear off as yields increased roughly to the level prior to Bank of England intervention.

Similar downward trends are also evident in the UK government index-linked bonds market, which have been impacted by a flight to quality (although QE has been focussed on nominal gilts). As shown in Figure 5.4, yields have been gradually declining since 2006[55] - a trend that started pre-crisis.

Figure 5.4 UK government index-linked gilts yields



Source: Datastream and PwC calculations[56].

[53] ibid

[54] BIS (2011), "The impact of recent central bank asset purchase programs", BIS Quarterly review December 2011.

[55] UK Government index-linked yields rose suddenly in late 2008 at a time of extreme market stress, particularly in relation to the banking crisis at the time where the government was committed to significant bail-outs costs from the banking sector.

A number of explanations have been suggested for the decline in index-linked yields, including:

- The savings "glut" from Asia. As Asian countries created substantial trade surpluses, these were recycled into global capital markets. This strong level of demand has contributed to dampening pressure on government bond yields.

- A movement of certain pension fund asset allocation into long-dated index-linked bonds, driven in the desire to reduce the volatility of defined benefit pension schemes and match long-term index-linked liabilities with long-term index-linked assets.

- Inflation hedging. As uncertainty about the future track of inflation increases, index-linked bonds become more attractive, potentially contributing to a reduction in yields.

In conclusion, the overall evidence analysed in this sub-section suggests that:

- UK (and US as well as German) government gilts, nominal and index-linked, are perceived to be "safe havens" compared to more risky corporate debt and equity asset classes as a consequence of the recent financial market volatility. This, along with other factors such as the assets purchase programme by various central banks (including the Bank of England's QE programme) and demand from institutional investors has lead to increased bond prices and lower yields;

- Yields on investment grade corporate bonds have been relatively stable following a period of volatility during the financial crisis, although corporate bond spreads are higher than pre-crisis levels, reflecting depressed government benchmark yields and a re-pricing of credit risk, or elevated credit risk;

- The sovereign debt crisis in the Eurozone area has led to extremely high yields on bonds issued by some of the European countries, particularly Greece and Ireland, given significant sovereign solvency concerns. This has further augmented the flight to quality effect as investors seek safer investments in UK government securities; and

- The yields on UK index-linked gilt securities are at an all time historic low, with current spot estimates being negative across all maturities.

5.1.4 Future expected returns

UK government bonds

Whereas the historic performance of bond returns is a useful guide to the returns that have been achieved, the best estimate of the future expected return can be obtained from the market pricing on traded bond investments.

The focus of this sub-section is to assess the future expected real returns for UK government gilts. In principle, there are two ways to estimate expected real returns:

- Review the yields and underlying trends in the index-linked gilts market[57]; or

- Focus on the redemption yields on nominal gilts securities and subsequently adjust for expected long-term inflation, in line with the conclusions we draw from our assessment of inflation in Section 3.

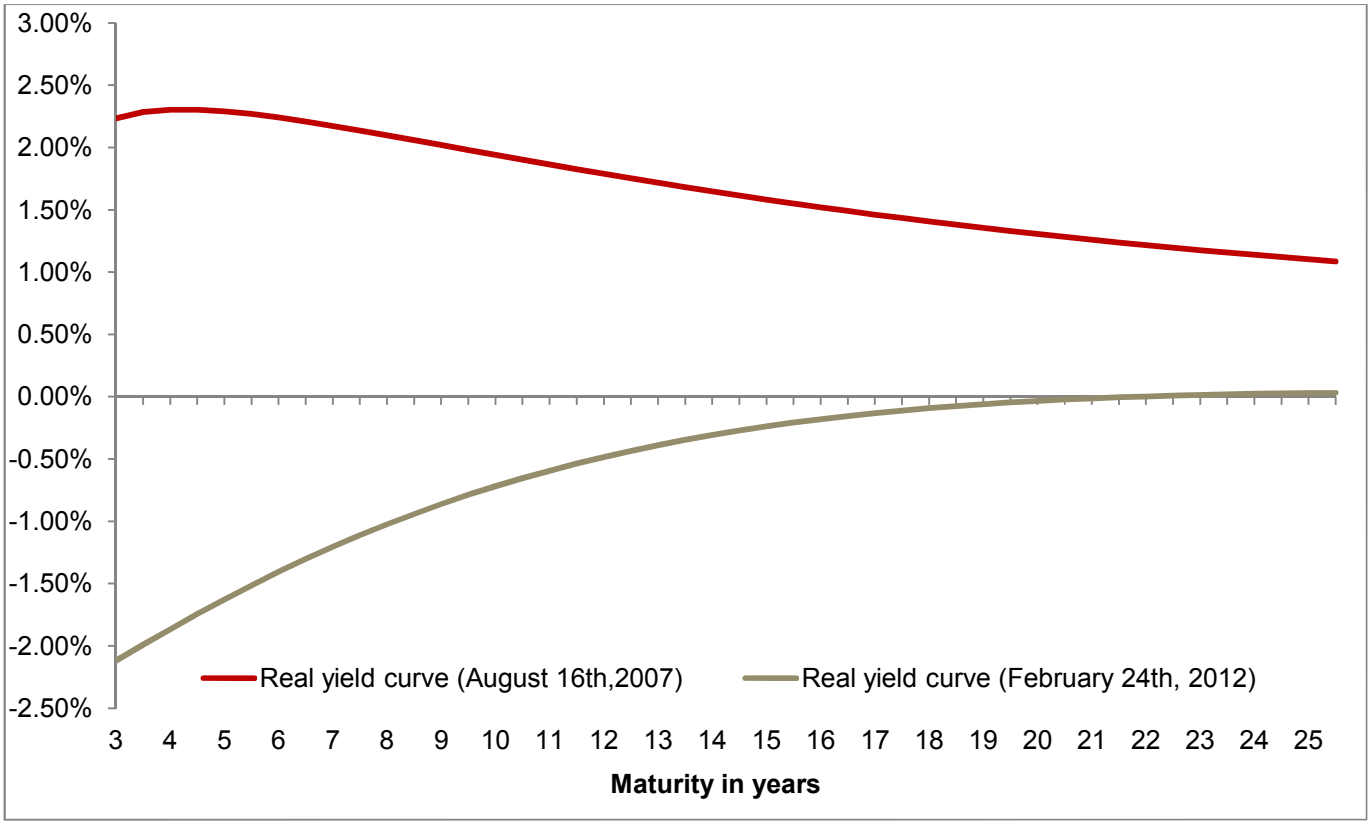
[56]See "Why Are Yield Curves So Flat and Long Rates So Low Globally?, Governor Randall S. Kroszner at the Bankers' Association for Finance and Trade, New York, New York, June 15, 2006 and "Cracking the conundrum", Backus and Wright, Brookings Papers on Economic Activity, 2007.

[57] The return is technically not totally risk-free, as the inflation adjusted principal is based on the retail prices index (RPI) value three or eight months prior to the interest payment date, resulting in a very small residual inflation risk. The gross redemption yield calculation also assumes that coupons are reinvested at the gross redemption yield rate.

Index-linked UK government bonds

The shape of the UK sovereign real yield curve has shifted markedly based on current estimates compared to those incorporated in our 2007 report, as reflected in Figure 5.5 below, with the short and long end of the real yield curve declining sharply. The current yield curve is upward sloping compared to a downward sloping yield curve in 2007, with predominantly negative yields across all maturities (with yields on very long-dated maturities being close to zero) and a sizeable maturity premium associated with longer-term investing (difference between the long and short end of the curve). The current spot yield on 25 year index-linked government bonds is 0.03% which is higher than the 10 year index-linked government bond yield of -0.65%[58].

Figure 5.5 Real yield curves



Source: Bank of England and PwC calculations.

This does suggest that current index-linked gilt spot yields might be a temporarily "distorted" measure of expected real returns. This distortion, in part, is explained by the yield on index-linked gilt securities being linked to the RPI, which is currently affected by a number of factors, most importantly the change in the underlying methodology (i.e. formula effect as discussed in Section 3.3.1) for calculating the RPI itself which yields a higher implied estimate for expected inflation.

Given the distortion in inflation expectation based on RPI estimates, we believe that the GDP deflator is a more appropriate measure for expected inflation over the next 10-15 years. Thus, when estimating the risk-free rate based on index-linked gilt securities, we propose to adjust current spot yield estimates upwards by the difference between our estimates for the RPI and GDP deflator i.e. 3¼% less 2½% (roughly ¾%). The current spot[59] estimate on 10 and 15 year index-linked government bonds is around -0.65% and -0.21%, which when adjusted for inflation based on the GDP deflator implies yields of 0.10% and 0.54%[60], respectively. Although, slightly higher compared to yields based on RPI, the spot estimates are still low by historical standard reflecting

[58] As of 24/02/2012, from Bank of England data downloaded from http://www.bankofengland.co.uk/statistics/yieldcurve/archive.htm

[59] As of February 2012 figures used in the report.

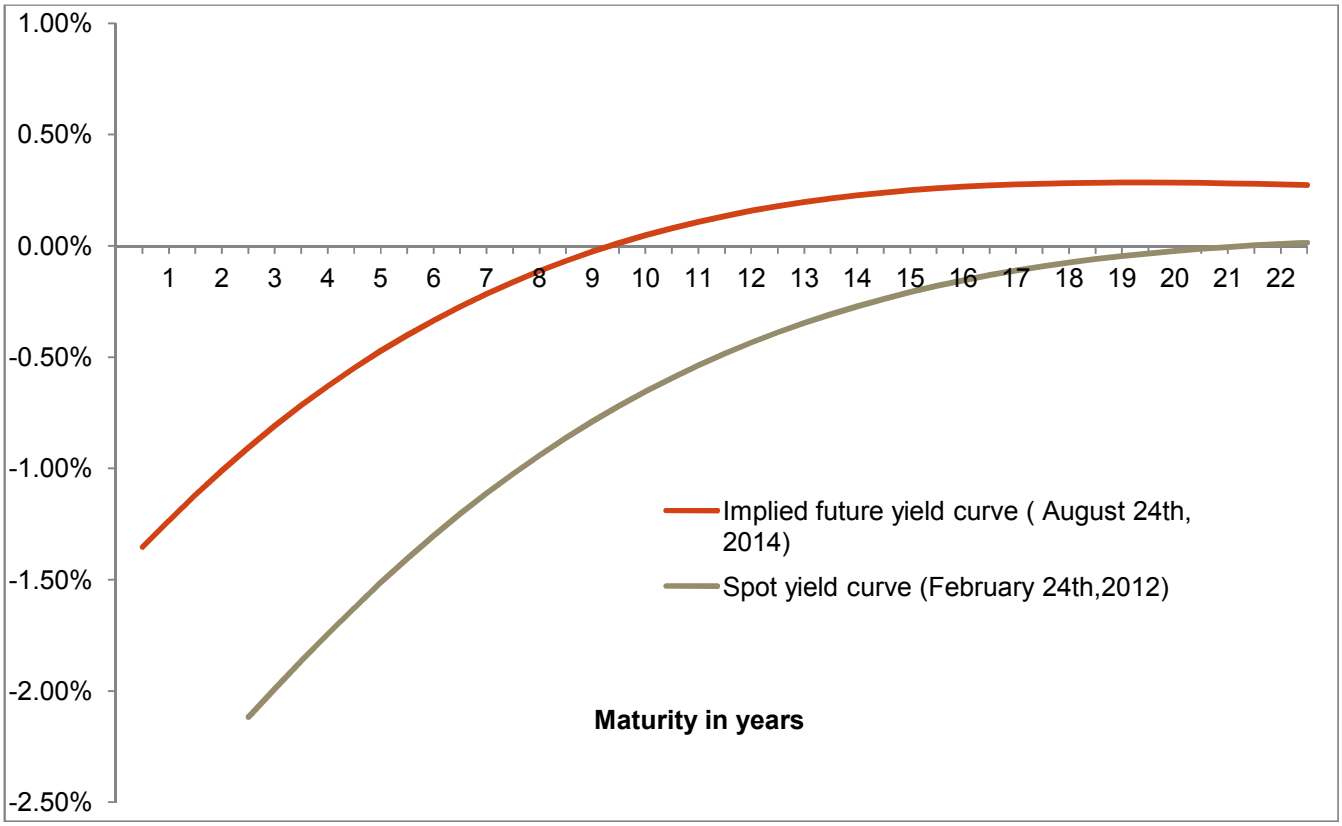
[60] By adding 0.75%, which is the difference between the inflation estimate based on RPI and GDP deflator.

the fact that the market for gilts is currently depressed due to non-market factors such as flight to quality effects and demand from institutional investors.

The challenge for investors is that, while markets may be distorted by a number of factors, these yields are representative of the yields available to investors (i.e. investors have to accept these returns or move to other asset classes. While individual investors may be able to do this the aggregate market for retail investment can't make such a rapid and fundamental switch). The challenge we need to address is whether these distortions are likely to unwind in the near-term, and therefore a different figure may be more appropriate for the purpose of producing projections.

Figure 5.6 below shows the current spot yield curve as well as the implied forward yield curve in 2 to 3 years from now, over the next 10-15 years.

Figure 5.6 Index-linked bond yields – implied forward rate



Source: PwC calculations based upon Debt Management Office data

The implied forward yield[61] suggests that the current market expectation for the yield on index-linked gilts with a maturity of 10-15 years in 2 to 3 years time is on average between 0.3% to 0.4%[62]. This is higher than the current estimate on 10 and 15 year index-linked government bonds based on RPI i.e. unadjusted for expected inflation estimates based on the GDP deflator (which is around -0.42% and -0.16%, respectively) suggesting an expected reversion from currently negative spot yield estimates and changes in the shape of the yield curve in the future.[63]

[61] This is achieved by bootstrapping, a statistical technique used to produce a yield curve from current prices.

[62] This represents an average on the 5 to 10 year maturity gilts, 5 year from now based on the implied forward rate curve.

[63] Whilst current market expectations suggest government bond yields will gradually rise, experience of the past few years is that actual market pricing of Government bonds can move considerably on a daily basis in reaction to various economic and market events. Indeed, the forward curve can vary on a day by day basis, thus reflecting the inherent volatility and movements in underlying yields. However, the forward curve still provides an aggregate market view of the likely track of government bond rates.

Taking these adjusted yields estimates into account, and our view that the market for gilts is currently being depressed by short-term factors (for reasons discussed in the report, such as flight to quality and demand from institutional investors) we consider an overall range of ½% - 1.0% (with a mid-point of ¾%) as appropriate for expected medium-term real return on index-linked gilts.

Nominal UK government bonds

An alternative approach is to calculate the expected real government bond returns based on the observed nominal government bond yields. However, at present, the current estimates for the yield on nominal government bonds are also impacted by flight to quality effects and Bank of England's QE programme. Indeed, the current spot estimate of the yields on nominal gilts of 10-15 year maturity of 2.2% - 2.9% are considerably lower than historical 5 year averages of 4.0% - 4.3% (with a mid-point close to around 4.15%), respectively.

The current spot estimate of the yields on nominal gilts of 10-15 year maturity of 2.2% - 2.9% compares to 3.0% to 3½% when using our adjusted real government bond yield and GDP deflator assumption (½% - 1.0% for real government bond yield plus 2½% for the GDP deflator). Moreover, given the low yields available on short- to medium-term nominal gilts (discussed above), it might be more appropriate to benchmark gilts with longer-term maturities, when estimating a reasonable range for expected yield on nominal gilts, which are less impacted by the QE programme, which focuses on gilts with maturities roughly between 5-15 years). The current spot yield estimate of 25 year maturity nominal gilt is around 3.4%, which is broadly consistent with our nominal yield estimates of 3.0 % to 3½% build up using adjusted real government bond yields and the GDP deflator.

Selection of real UK government bond assumption

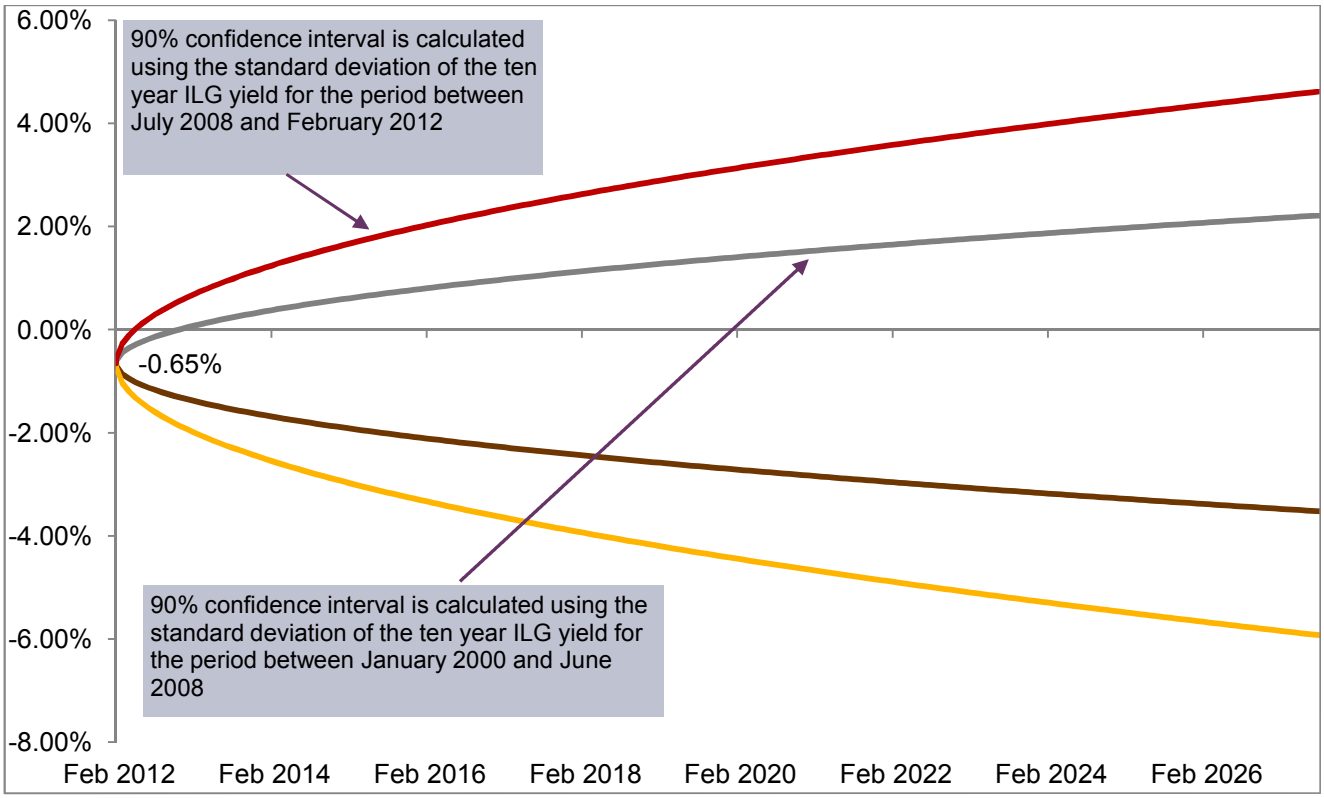
In view of the different approaches for estimating the appropriate real government bond yield and the need for the projection bases used by the FSA to be durable for a number of years, during which the yields may fluctuate somewhat, we conclude that a range for real return of ½% to 1.0% is appropriate for medium-term UK government bonds. This is slightly above current market levels and anticipates some reversion towards more normalised yields. The real yield on UK government bonds (based on default RPI assumption) over the shorter-term is likely to be up to a percentage point lower, whereas adjusted yields using the GDP deflator are likely to be marginally lower).

There is still considerable uncertainty associated with the likely medium-term movement of the index-linked gilt yields – this is reflected in the fan chart below, which shows the spread around the spot yield on 10 year index–linked gilts in the future. For illustrative purposes, the 90% confidence interval is calculated using the standard deviation estimated across two separate scenarios:

- July 2008 to February 2012, reflecting the period of financial turmoil; and
- January 2000 to June 2008, reflecting the relatively more stable pre-crisis period.

The analysis in Figure 5.7 suggests a broad distribution for the likely yield on index-linked gilt securities. Based on the higher standard deviation for the crisis period index-linked gilt yields could reach close to 4% over the next 10-15 years; the estimate using the standard deviation for the pre-crisis period suggests index-linked gilt yields could reach a figure of around 2%. Similarly, on the downside, the yields can potentially fall as low as -4% or -2%, based on the standard deviation for the crisis and pre-crisis period, respectively, but there may be limits to how low real yields can feasibly go.

Figure 5.7 Variability in expected yield for 10 a year Index-linked Gilt



Source: PwC calculations based upon Debt Management Office data

Foreign government bonds

We note in Section 4, that pension funds allocate around 4% to overseas fixed income bonds and some with-profits investments may have slightly higher weighting towards overseas fixed income investment.

A small allocation is unlikely to shift the overall projected return rates, but is worth consideration. This is because there are two potential sources of higher return from investing in overseas bonds. These are:

- Some overseas sovereign bonds may not be as impacted by flight to quality effects. Outside "safe-haven" of the US, UK and possibly Switzerland, there may be better yields on offer to fund managers. However, such yield also comes with currency risk (which can be hedged at relatively low cost).

- Increasingly sovereign bond investments carry sovereign credit risk. This increases the yield available, but also the risk of capital loss.

Because we require an expected return, we need to consider the probability of capital loss in generating projection rates. For example the gross redemption yield to maturity on a Greek government bond may be above 20%, but this yield will only be achieved if the bond is held to maturity and the Greek government make full and complete contractual payments. Currently, the market pricing of Greek government bonds is discounting the likelihood of full and complete contractual payments, either through negotiated "haircuts" or outright default. The challenge is then to assess the appropriate risk-adjusted expected return on overseas government debt. This essentially requires extracting the probabilistic impact of default risk, or estimating the underlying systematic risk of overseas debt instruments. This is a technique we use in assessing the appropriate expected return on corporate bonds in Section 5.3.

However, because allocation of fixed interest investment in overseas bond markets is low, and because much of the additional yield available to investors is merely to compensate for default risk, we do not explicitly adjust our government bond expected rate of return for overseas investments. We note the potential for fund investors

to enhance returns through overseas bonds which is one further reason to support an assumption for real bond returns slightly above that suggested by the current market pricing of long-term UK government bonds.

Moreover, as suggested in Section 3, there is uncertainty surrounding exchange rate expectations over the next several years, whilst there might be movements in the value of the Pound vis-a-vis the Euro and other currencies we do not expect these to be extremely significant and believe our overall range for expected returns on government bonds takes account of such developments going forward.

Allowing for some rebalancing away from medium-term gilts, the likely direction of UK gilt yield over the next few years and the potential for some (very marginal) higher risk-adjusted returns from investing in overseas Sovereigns, we suggest using figures for nominal government bond yields in the 3.0% to 3½% range.

5.1.5 Importance of the risk free rate in calculations

Figure 5.3 above shows the historic gross redemption yield on UK fixed income gilts. Since the summer of 2007 the yield has remained below 5.0%, and more recently substantially below 4.0%. Taking this as a risk-free rate, the lower of the FSA's three standard projection rates (5%) has often been above the risk-free rate.

For this reason it may be helpful if, even when projections are used to demonstrate likely returns for low risk investments, consumers could be informed that even the lowest projection rate does not set the minimum return they could expect, as to achieve 5.0% will require the fund manager to bear investment return risk.

5.2 Equities

Equities are perceived to be a riskier conventional asset class for investors, for which they require higher expected returns in compensation. In principle, return to equity holders can come from two sources, actual dividends paid by the company and/or realised capital gains at the point of disposing the equity holding. As such, the high risk associated with equity investments is a consequence of the following key factors:

- Unlike coupon payments on debt securities, dividend payments on equities are not contractually guaranteed and are made at the discretion of the company. The value of dividend payments made to shareholders can therefore increase or decrease over time, or there could be prolonged periods without any dividends being paid to shareholders at all;

- The fluctuations in equity values over time mean that there is uncertainty over the value of any potential capital gains; and

- Equity holders are subordinate to debt holders in the creditor hierarchy. This means that shareholders are residual claimants, either in relation to receiving payments out of company earnings through dividends after all interest payments on liabilities have been made, or to claim any residual value after other senior creditors (debt holders) have been paid off in the event of bankruptcy.

There is no direct way of observing the returns equity investors expect (unlike for bonds, where the yield is observable in bond markets); rather we need to gauge return expectations from economic models fitted to financial market data[64]. The cost of equity, or the required returns by equity providers, is generally estimated using as the sum of the risk-free rate and the equity market risk premium ("EMRP"). The risk free rate represents the returns on risk-less investments and is usually proxied by reference to yield on government bonds, whereas, the EMRP represents the compensation required by equity holders for investing in the broader equity market over and above the risk free rate (i.e. return on equity less the risk free rate).

In our 2007 report, we concluded that the best estimate for the EMRP was 3% - 4%, which implied a real return on equities of 4¾% to 6% (assuming a risk free rate of 1¾% - 2.0%). This corresponded to a nominal return of 7½% to 8¾% (assuming a 2¾% rate of inflation).

[64] For more information on the derivation and practical application of economic models of return expectations, refer to Ogier T, Rugman J and Spicer L (2004) "The real cost of capital, a business field guide to better financial decisions", FT Prentice Hall

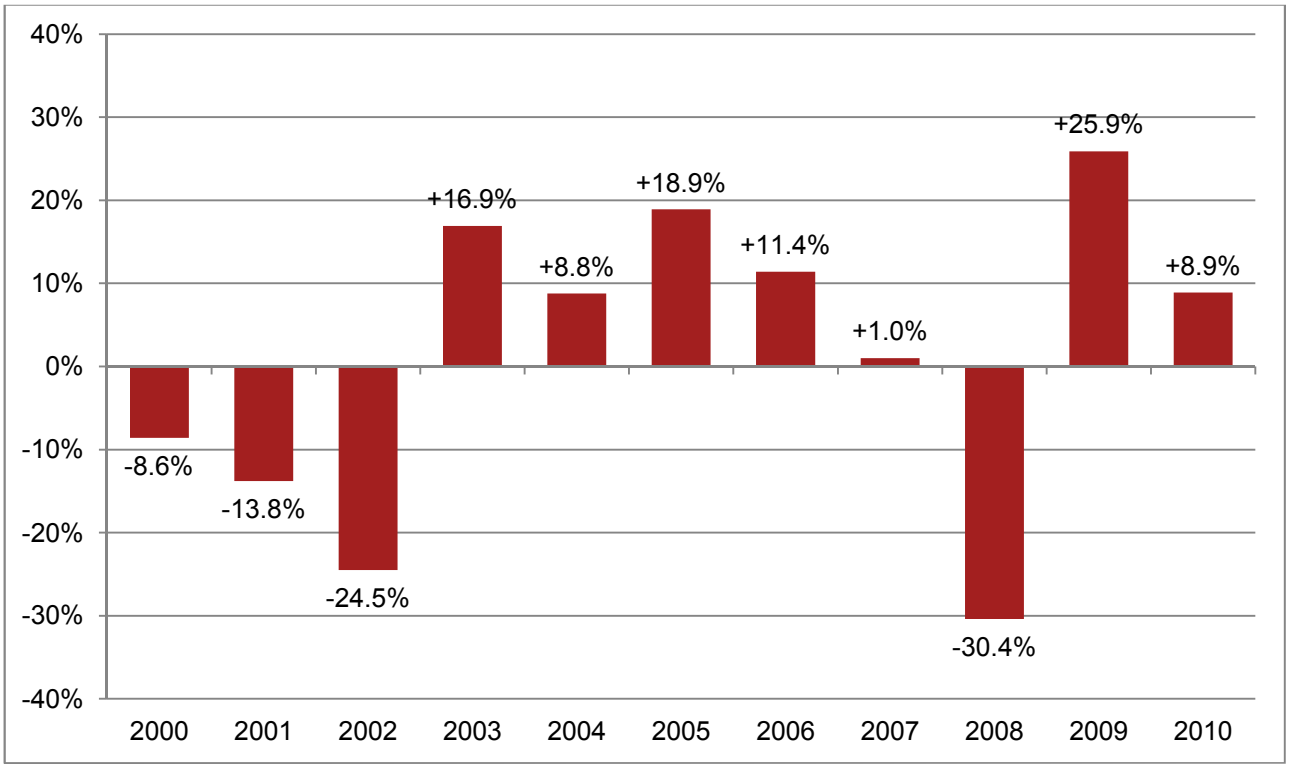
We now review recent equity returns and developments in equity capital markets and provide an updated assumption for historical and expected future equity returns. Our focus continues to be on the UK market; however, as discussed in Section 4, given the rising trend towards portfolio diversification into international equities (US in particular) – we do incorporate the impact of such developments in our overall estimate for projected future equity returns and the EMRP.

5.2.1 Recent historical equity returns

Equity markets have been particularly volatile in recent years. The average annual real return on UK equities since 2007 was -1.5%[65], whereas the return on US equities was -2.8% over the period 2007 – 2010, based on Barclays Capital data. The comparable estimate for the return on UK equities for the period between 2003 and 2006, quoted in our 2007 report, was an average annual real return of 14%. The variability for equity returns has been substantially greater than at any other time in the past 10 years, as shown in Figure 5.8 below.

The dividend yield on the FTSE 100 has remained relatively stable over this time-frame, except for a short period during the financial crisis when falling share prices gave an artificially inflated short-term appearance, before dividend payouts fell to reflect tough economic conditions[66].

Figure 5.8 Real annual returns on UK equities



Source: Barclays Equity Gilt study, PwC calculations

5.2.2 Implications of the recent developments in equity markets

In section 5.1.1 we reviewed the implications of the financial crisis in 2007/2008 and more recent sovereign debt crisis on returns for government bonds. In this section we reprise these events to analyse development in equity capital markets and likely implications for equity investors.

[65] Barclays (2011), "Equity Gilts Study", additional tables covering UK real return on equities – gross income re-invested.

[66] For information please see Bloomberg, "Estimated dividend yield rankings of FTSE100 companies", http://www.bloomberg.com/news/2011-12-01/estimated-dividend-yield-rankings-of-ftse-100-company.html

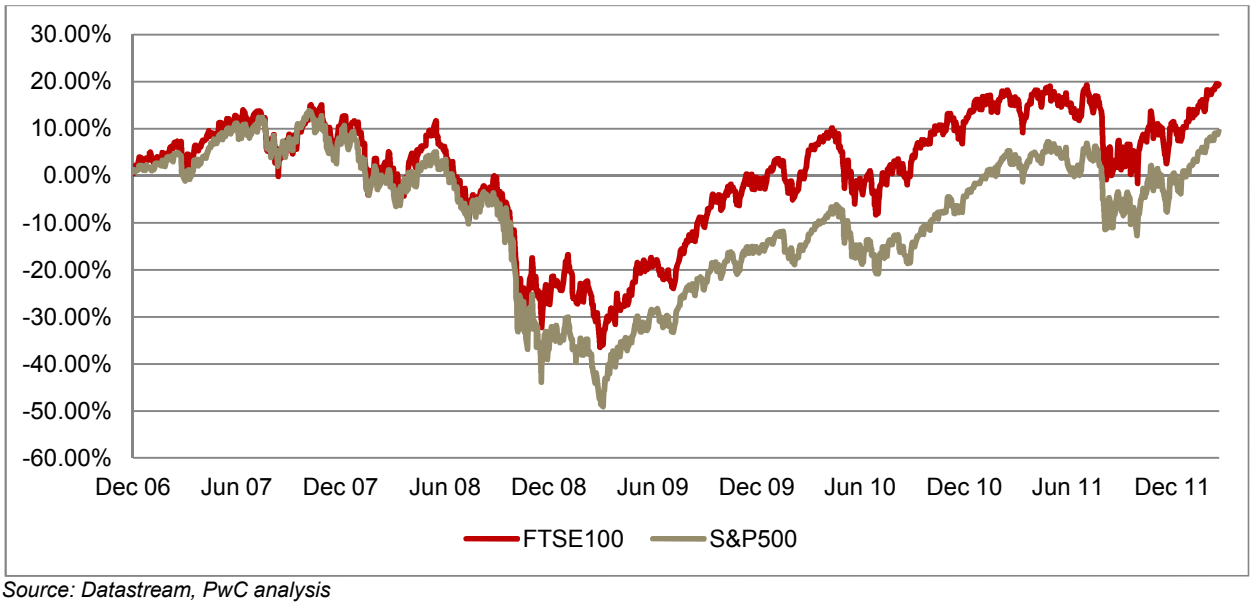
The key themes relevant to equities incorporate some elements that have already been referred to above, however, they broadly encompass:

- A global 2008/9 recession and an uncertain but generally negative outlook for economic growth and corporate cash flows;
- Significant increases in the cost of finance during the financial crisis prompted by the flight to quality into government bonds, leading to a severe lack of liquidity in corporate debt and equity capital markets, the "credit crunch";
- Unprecedented levels of government and central bank intervention through capital injections and expansions of the money supply, particularly through the Bank of England's QE programme;
- Increased risk aversion and erosion of investor confidence, leading to historically low yields on government bonds as investors tried to diversify portfolios through focusing on safer investments; and
- Severe and prolonged levels of volatility in equity markets.

In principle, the impact of recent events can be directly observed from equity market valuation indices (such as the FTSE 100 in the UK and the S&P 500 in the US).

The financial crisis was accompanied and intensified by serious stock market crashes in both the UK and other countries (including the US). Figure 5.9 below shows the returns on the FTSE 100 and S&P 500 over the last 5 years, taking December 2006 as the starting point[67]. During the financial crisis the market was severely impacted, for example, during late 2008 and early 2009 the FTSE and S&P 500 fell by almost 50% relative to the peak. The FTSE 100 is currently trading at around 5,900, whereas the S&P500 is at around 1,350 – these are markedly higher than the index low point values of 3,512 and 676 for the FTSE 100 and S&P500[68] during financial crisis – however, still lower than the pre-crisis values in 2007[69]. This means that any returns for equity investors over the last few years are likely to have been heavily influenced by timing of investments and disposals.

Figure 5.9 FTSE-100 and S&P500 (total returns index) performance since 2006



Source: Datastream, PwC analysis

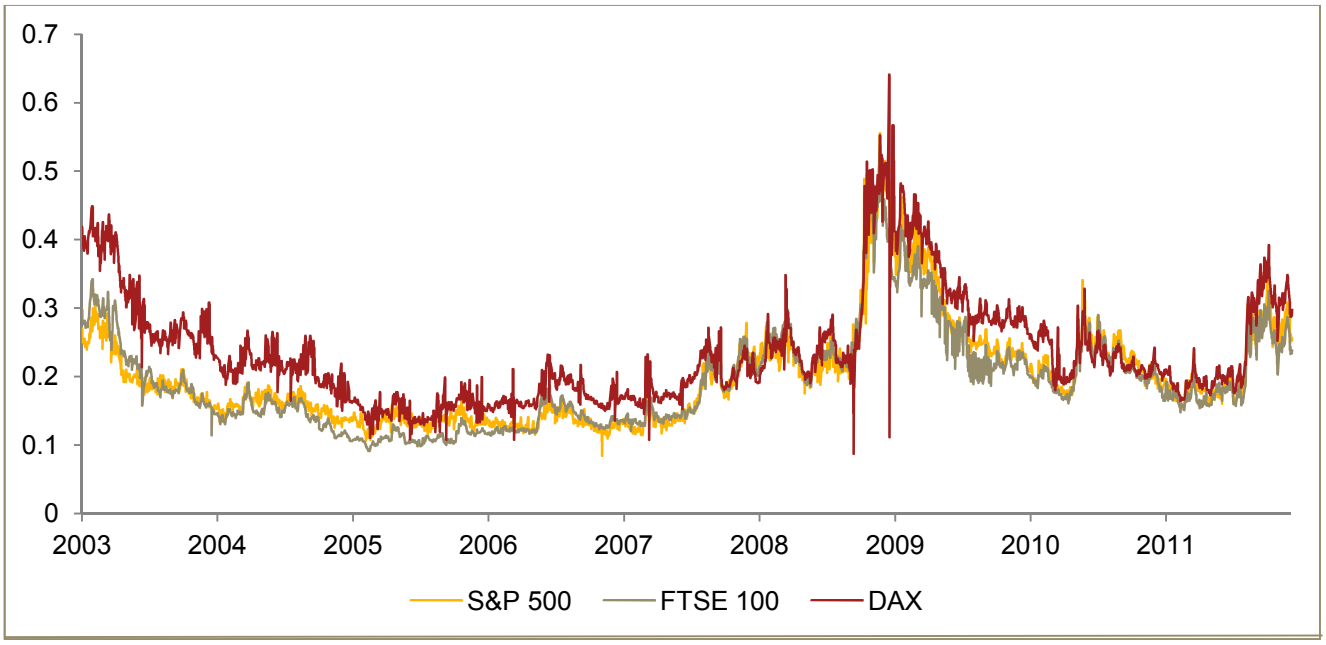
[67] These reflect the returns at any point in time an investor would have made had he invested in the FTSE100 or S&P500 in December 2006.

[68] As on 3rd March 2009 for FTSE 100, and 9th March 2009 for the S&P 500.

[69] The FTSE 100 and S&P 500 indices averaged around 6,347 and 1,447 between December 2006 and May 2007.

Equity market volatility[70] had reached unprecedentedly high levels at the peak of the financial crisis, and although it has declined since it remains above pre-crisis levels. Higher volatility would normally increase equity investors' return requirements.

Figure 5.10 Volatility measures across selected equity markets



Source: Datastream, PwC analysis

Nonetheless, government and central bank actions, for example through capital injections into the financial system, aggressively cutting interest rates and Quantitative Easing in the UK and similar Credit Easing programmes in the US have sought to improve liquidity and access to financing in the market, as well as reduce any volatility in underlying inflation expectations to promote stable growth. There were several channels through which Quantitative Easing was expected to have an effect. Firstly, lower gilt yields would, "all else equal, increase the present value of future dividends, thus raising equity prices"[71]. Secondly, through the "portfolio channel"[72] investors who held government securities which were purchased by the Bank of England under the QE programme would reallocate the cash into other asset classes, such as equities or corporate bonds, to maintain efficient portfolios. These actions are generally accepted to have had a positive impact on equity values. The period during which the Bank of England first launched Quantitative Easing coincided with a strong increase in UK equity returns[73] and a recent Bank of England paper suggested asset prices may have been supported by as much as 20% as a consequence of Quantitative Easing[74]. Given the globally diversified nature of the UK stock market, and the influence of foreign events on domestic stock prices, it is difficult to identify a precise UK-specific effect of the Quantitative Easing programme on equity markets.

Various academics have also looked at the relationship between equity market valuations, expected return on equities and macro-economic volatility. In essence, during periods of increased financial instability marked by elevated macro-economic risk levels, stocks prices typically decline as the compensation required by equity

[70] This refers to implied volatility from option pricing using the approach suggested by Black-Scholes.

[71] Joyce M, Lasaosa, A, Stevens, I and Tong M, (2010) "The Financial Market Impact of Quantitative Easing", Bank of England working paper 393, p26

[72] See Bank of England Quarterly Bulletin Q3 2011, "The United Kingdom's quantitative easing policy: design operation and impact", p202

[73] Ibid p206

[74] Bank of England Working Paper No. 442 "The impact of QE on the UK economy — some supportive monetarist arithmetic", Jonathan Bridges and Ryland Thomas

investors for investing in stocks increases along with the expected return on equities. Indeed Lettau, Ludvugson and Wachter (2007) and Vayanos (2004) among others find that during periods of increased financial market instability, assets prices become negatively correlated with volatility as equity risk-premia increases. Similarly, there is a strong positive correlation between low-frequency movements in macroeconomic volatility (i.e. reflecting periods of business expansion) and asset prices.

Asset prices (stocks in particular) might also potentially be linked to inflation expectations during periods marked by increased market volatility through movements in underlying real interest rates, as suggested by Glasner (2011) who found a strong and statistically significant correlation between asset prices and inflation expectations. In principle, this would imply that during periods of weak economic outlook expectations of real economic growth can be increased by increasing inflation expectations (and thereby increasing equity prices), however, once inflation expectations are normalised and they trend towards the target rate of inflation (as expected overtime in the current context), equity prices might still be inflated implying the returns on equities are potentially overstated. Whilst the correlation might exist and in turn impact the overall return on equities, it is important to note there are a number of different factors that are concurrently affecting asset prices and inflation expectations, such as the Bank of England's Quantitative Easing programme with similar implications for asset (equity) returns, thus looking at the two in isolation and drawing any significant inference on implications on equity returns might be imprudent. Nonetheless, an overall assessment of equity returns needs to consider current market trends and expectations going forward.

Moreover, during periods of increased market volatility assets' illiquidity premia increases and investors are likely to become more risk averse - leading to flight to quality into safer assets (such as government bonds, as discussed in detail above). Under such a scenario it has been argued that the equity risk-premia increases whilst the yield on government securities typically decreases – thus suggesting the overall expected return on equity is more stable than underlying government bond yields (see Smithers and Co (2003), McKinsey (2008) and Grabowski (2011), as set out in Appendix C for more information) and that any deviation of short-term equity returns is expected to slowly revert to its mean overtime (as suggested by Fama and French 2002).

Consistent with the academic evidence above, equity valuations declined significantly over the period 2007 to 2008, before partially recovering in recent years. The valuation declines can be explained by falling estimates of the future cash flows attributable to equity investors and/or the risk attached to those cash flows. This implies that it is possible that falling equity values have helped to restore higher future equity return potential. Thus future returns could be less impacted by the immediate outlook for company performance (which should be factored into current share prices), and could be more impacted by equity investor return requirements, which if anything, are likely to have risen since our last report.

In principle, it is important to make a distinction between the returns required by investors for bearing risk and the future returns which are likely to be achieved by investors. While normally the two should match, in principle, they could diverge. Investors may require increased compensation for bearing systematic risk in current market conditions; however, with a weaker macro-economic environment the potential investment opportunities with such required returns can reduce and restrict the overall returns available to equity investors.

5.2.3 Methodology for estimating future equity returns

Estimating future equity returns is more uncertain than estimating future bond returns as there is no direct way of observing the returns equity investors expect (unlike for bonds, where the yield is observable in bond markets). There has been a substantial body of economic research devoted to the study of equity returns. In Appendix C, we provide a review of the key studies on this topic.

Historically, academic research focussed on the estimation of the Equity Market Risk Premium (EMRP), which can be combined with an estimate of the risk-free rate to produce an expected equity return. Many studies focus on the historical analysis of equity returns to gauge future expectations, but some studies propose adjustments to produce better forward-looking estimates. Other studies focus exclusively on forward looking approaches – such as surveys of investors, or using market information to imply a figure for the EMRP.

In 2007, the growing consensus was that a blend of approaches was appropriate. However the financial crisis and with it the substantial drops in interest rates and increases in equity market volatility led to both a proliferation of different views on the appropriate EMRP and a challenge of whether the expected returns to equity investors is best determined from assessing its component parts. An alternative view is to assess real equity returns directly. The difference between our 2007 report and this report is that we are very careful in how we interpret and combine different source of evidence on the appropriate EMRP. It is clear that older studies have less relevance. Further, there is a clear risk of inconsistency in combining historical studies of equity risk premia with current figures for the risk-free rate. Likewise survey evidence is difficult to interpret if there is no indication of the underlying risk-free rate which investors are using.

Moreover, when estimating the appropriate EMRP (and thus the return on equity) we have made an explicit distinction between returns that reflect compensation for bearing risk and that which are actually available in the market to the investors – to the extent that risk in financial markets has increased as a consequence of increased market uncertainty – the compensation required for bearing risk might have increased but in the current macro-economic environment this does not appear to have been matched by an increase in investment return opportunities actually available for investors and companies. This means we are cautious about using relative risk measures to assess future expected returns.

In the following sub-section we review a range of evidence on equity returns.

5.2.4 Long run historic equity returns

Estimations of long-run equity returns are sensitive to the inputs used; these include the method of averaging used, the relevant time period of application and geographic coverage. In Table 5.1 below, we present results for UK and US equity returns over a selection of time periods below:

Table 5.1 UK and US long run equity returns

	UK			US		
Source	1900-2001	1900-2006	1900-2010	1900-2001	1900-2006	1900-2010
Ibbotson[75] (nominal arithmetic average)	n/a	n/a	n/a	12.7%	12.3%	11.8%
DMS (real geometric average)	5.4%	5.6%	5.3%	6.3%	6.6%	6.3%
Barclays EGS (real geometric average)	5.3%	5.3%	5.1%	7.2%	7.1%	6.7%

Source: Global investment returns yearbook 2011, Equity Gilt Study, Ibbotson Morningstar 2011

As reflected in Table 5.1 above, long run real[76] average equity returns have declined slightly, compared to the estimates used in our previous report, across both the UK and US equity markets. Based on Barclays data, the real return on UK and US equities, from 1900 to 2010, was 5.1% and 6.7%, respectively, which is somewhat lower than the to the 5.3% and 7.1% return between 1900-2006 quoted in our 2007 report. Similar estimates by DMS suggest that in the UK long-term average annual real rates of return fell from 5.6% to 5.3%, with a similar fall also seen in US returns from 6.6% to 6.3%.

This slight reduction reflects the peaking of equity markets in the 2007 figures and the subsequent negative returns following the financial crisis. Moreover, this brings out two important points:

- Historically high realised returns (above the long-term average), as witnessed in the time period leading up to 2007 (for example, the 14% compound annual return between 2003 and 2006) are likely, at some point, to be followed by negative returns.
- Long-term returns on equities are generally stable around the mean expected returns, simply because the addition of a few years of data has limited impact on a long data series.

[75] Ibbotson (2011) Valuations yearbook, Morningstar Associates.

[76] Note: Ibbotson calculates on a nominal basis.

5.2.5 Estimating the EMRP: Ex-post estimation

The table below represents the ex-post estimates of the EMRP across different sources. As previously noted the outcomes are sensitive to the timescales and averaging methods used and require separate assumptions on values for the risk-free rate. The EMRP can be estimated relative to government bonds or bills, using either geometric or arithmetic average. For the purpose of this report we focus on EMRP estimates relative to bonds, because it is easier to compare to our government bond return assumptions and we consider geometric averages more appropriate to compare to likely equity performance over a medium-term time period[77].

Table 5.2: Long run UK and US EMRP estimates

	UK			US		
Source:	1900-2001	1900-2006	1900-2010	1900-2001	1900-2006	1900-2010
Ibbotson (nominal arithmetic average)	n/a	n/a	n/a	7.4%	7.1%	6.7%
DMS (real geometric average)	4.8%	4.5%	4.3%	5.8%	5.6%	5.3%
Barclays EGS (real geometric average)	4.2%	4.2%	3.9%	5.0%	4.8%	4.3%

Source: Global investment returns yearbook 2011, Equity Gilt Study, Ibbotson Morningstar 2011

Based on DMS and Barclays, the current estimate for the ex-post EMRP in the UK ranges from 3.9% - 4.3%, similarly in the US the relevant range is 4.3% - 5.3%. Additionally, Morningstar[78] provide estimates for the geometric EMRP in the UK from 1970 – 2008 ranging between 5.4%– 6.1%. If long run realised returns are good indicators of the required returns, as some prevailing theory suggests, then the various sources indicated in the table above suggest a slight decline in the EMRP in both the UK and US markets compared to the 2007. Furthermore, it should be noted that the decline in the ex-post EMRP is relatively higher in the US compared to the UK, for example according Barclays, over the same time period. Similarly, Grabowski (2011)[79] found that a reasonable estimate for the long-term range of unconditional (i.e. ex-post) EMRP in the US was around 3.5% to 6.0%. Overall, the EMRP estimates across various commentators generally vary, indicating the potential uncertainty associated with estimating an appropriate EMRP.

Figure 5.11 below shows the EMRP estimates relative to bonds and bills for 19 countries, as well as "world" and "rest of world" with averages over the period 1900-2010 as summarised from DMS data. The spread of EMRP estimates over bills ranges from around 2.8% - 6.7%, and as is to be expected consistently higher than the EMRP relative to bonds in all countries, where the spread ranges from around 2.0% - 5.9%.

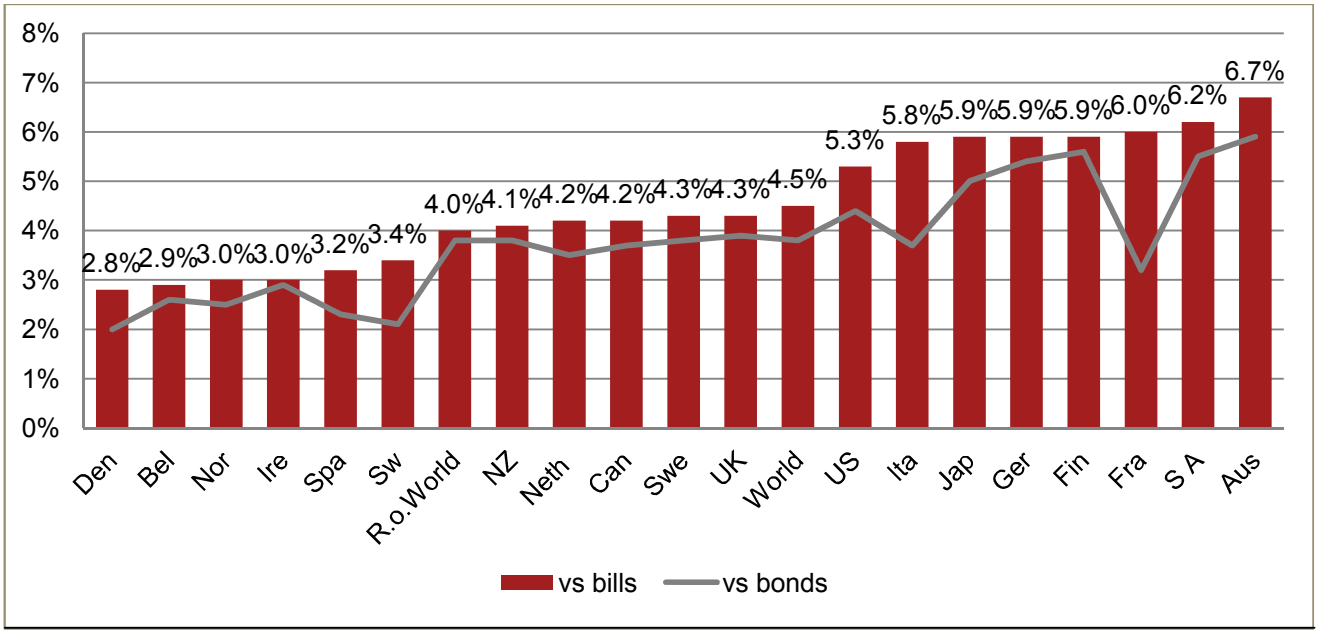
Given the increasing importance of global equity investment in portfolio investment (see Section 4), and the globalisation of companies on the FTSE-100 index, global returns are an important cross-check to UK returns. As can be seen from Figure 5.9, the UK and world EMRP values are very similar, with the relative differences of -0.2% for bills and 0.1% for bonds being relatively small.

[77] The arithmetic mean represents a simple average of annual returns, whilst the geometric return take into account the compounding effect of financial returns. The geometric mean will always be lower than or equal to the arithmetic mean. For further details on the difference and impact of arithmetic and geometric means see "The New Inflation Target: the Statistical Perspective", National Statistics, December 2003. This is available online at http://www.statistics.gov.uk/statbase/product.asp?vlnk=10913. The use of geometric averages is consistent and broadly supported by academics and practitioners alike; see for example Hughson E, Stutzer, M and Yung, C (2006), "The Misuse of Expected Returns", Financial Analysis Journal, volume 62.

[78] Morningstar, "International Equity Risk Premia Report", 2009.

[79] Grabowski, R, "Mid-2011 Risk-Free rate and ERP update", 2011.

Figure 5.11 Worldwide ERMP estimates relative to bonds and bills 1900-2010



Source: "Global Investment returns yearbook 2011"

Whilst we have noted that the World average and UK EMRP values are similar, it is clear from the chart above there is significant variation around this central estimate.

Overall, evidence from different sources on long-term ex-post EMRP suggests a range of 3.5% - 5.0% for the UK and 4.5% – 6.0% for the US.

Adjusting the historic EMRP

Numerous commentators have suggested that the historically observed risk premium should be reduced to take account of factors which may have inflated historic returns, and which would not be expected improve future returns. These include the impact of less diversified private investors in the early part of the last century with higher return requirements and unexpectedly high inflation in the 1970s, which depressed bond returns, thereby increasing the calculated equity market risk premium.

DMS present an empirically based solution by analysing components of the historical equity risk premium individually and then considering forward expectations on the basis of these individual components. The components identified by DMS are: the dividend growth rate, expansion in the price/dividend ratio, the average dividend yield and fluctuations in the real exchange rate. The table below presents the risk premia for 17 counties split into these contributing components.

Table 5.3: Decomposition of the historical equity risk premium, 1900-2010

Country	Geometric mean dividend yield (%)	plus* Real dividend growth rate (%)	plus* Expansion in P/D ratio (%)	plus* Change in real exchange rate (%)	minus* US real interest rate (%))	equals* Equity risk premium for US investors (%)
Australia	5.76	1.10	0.48	0.10	0.96	6.53
Belgium	3.72	-1.48	0.36	0.70		2.28
Canada	4.39	0.84	0.56	0.09		4.94
Denmark	4.58	-1.13	1.64	0.57		4.69
Finland	4.76	0.49	0.09	0.15		4.53
France	3.81	-0.90	0.18	-0.04		2.05
Germany	3.66	-1.16	0.58	0.31		2.40
Ireland	4.57	-0.94	0.16	0.31		3.09
Italy	4.06	-1.52	-0.47	0.20		1.24
Japan	5.22	-2.39	1.08	0.54		3.39
Netherlands	4.94	-0.51	0.55	0.35		4.34
New Zealand	5.38	1.26	-0.84	-0.21		4.60
Norway	4.00	-0.13	0.33	0.38		3.62
South Africa	5.82	0.95	0.46	-0.61		5.65
Spain	4.18	-0.60	0.01	0.12		2.71
Sweden	4.02	1.77	0.43	0.09		5.41
Switzerland	3.48	0.46	0.28	0.94		4.22
UK	4.63	0.46	0.20	-0.06		4.27
US	4.24	1.37	0.56	0.00		5.26
Average	4.49	-0.11	0.35	0.21	0.96	3.96
Std. Deviation	0.69	1.18	0.51	0.35	0.00	1.39
World (USD)	4.11	0.83	0.48	0.00	0.96	4.49

Source: Equity Risk Premia around the world, Dimson Marsh and Staunton (2011)

The DMS view of real dividend growth for the UK of 0.46% is lower than the figure included in our previous 2007 report, as is their estimate of 0.83% for the world, but is probably a good approximation of future growth, with some forecasting even higher growth of 2%[80] and some commentators projecting real dividend growth of zero or less[81].

DMS consider a forward looking (geometric) EMRP of 3.0%-3.5% (4.0%-4.5% on an arithmetic basis) for the world, they conclude that their forward looking estimate is below the historic average for the second half of the 20th century, but suggest that textbook informed approaches to the EMRP will likely overstate it: "*investors who rely on such numbers are likely to be disappointed*"[82].

Roger Ibbotson and Peng Chen (2003)[83] also analysed historical and forward looking long-term sustainable equity returns and expected EMRPs since 1926 in the US. They analyzed historical equity returns by decomposing them into various factors representing the fundamental building blocks of equity returns such as inflation, earnings, dividends, price-to-earnings ratio, dividend-payout ratio, book values, return on equity, and GDP per capita and subsequently forecasted the EMRP through supply side models built from historical data.

[80] Ilmanen A, "Expected returns", Chichester

[81] Arnott, Bernstein (2002) "What Risk Premium is "Normal?", Financial Analysts Journal, Vol. 58, No 2

[82] Dimson, E., Marsh, O., and Staunton, M. (2011), "Equity premia around the world", LBS

[83] Ibbotson, R, Chen P 2003. "Long-Run Stock Returns: Participating in the Real Economy." Financial Analysts Journal, vol. 59, no. 1 (January/February):88–98 or Ibbotson Valuations yearbook for more information.

Their conclusion suggested the long-term EMRP since 1926 that could have been expected given the underlying economics (the supply side model estimate) was approximately 5.2% (arithmetic average).[84]

5.2.6 Estimating the EMRP: Ex-ante approaches

In this sub-section we review ex-ante (or forward looking) approaches for estimating the EMRP.

Forward looking surveys

Recent economic literature has emphasised the importance of capturing the forward looking aspects of EMRP estimates. A number of academics and practitioners focus on estimating an ex-ante estimate for EMRP, however, similar to ex-post approaches there are likely to be differences in underlying estimates, both in time and across different sources.

One comprehensive source of survey evidence on the EMRP has been carried out by Fernandez and others at the IBBE School[85]. Below we set out the results from their most recent survey in 2011 to capture the estimates of academics, analysts and companies. This suggests a current figure for the UK of around 5.0% to 5.6%.

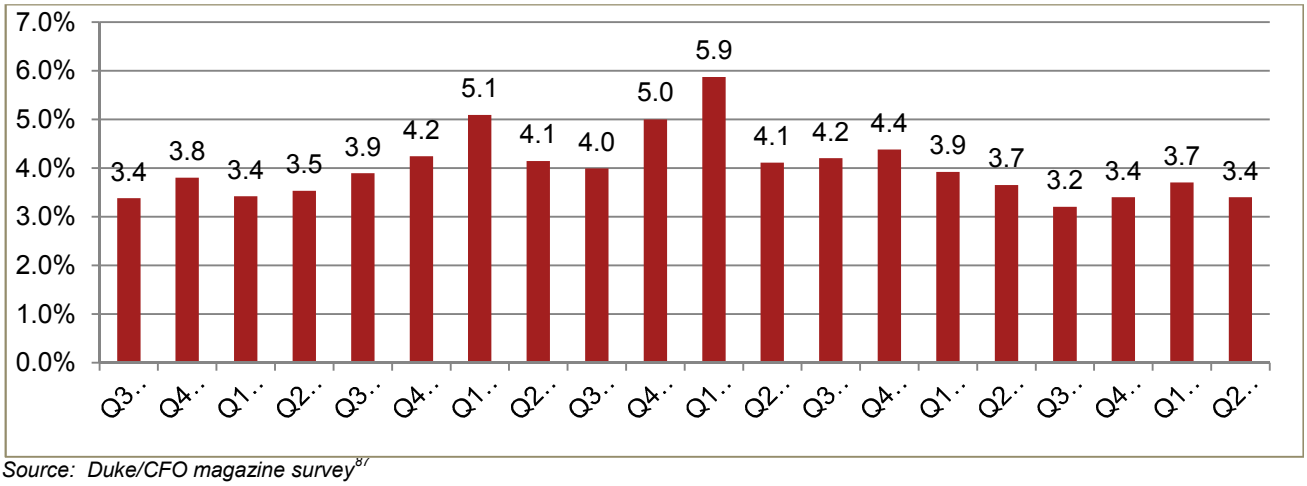
Table 5.4 Survey responses for the EMRP used in 2011

	Mean EMRP estimate			Standard Deviation		
	Analyst	Company	Academic	Analyst	Company	Academic
US	5.0	5.5	5.7	1.1	2.0	1.6
UK	5.4[86]	4.9	5.6	1.6	1.1	4.0

Source: Fernandez (2011)

Broader survey evidence is available from the US. The Duke University Fuqua Business School has carried out a quarterly survey of CFOs of US public and private companies, on the expected EMRP, since October 1996, capturing 62 consecutive quarters of information. In the 5 years leading to the 2007 report, the average forward looking EMRP forecast was 3.5%. In the 5 years leading up to the current report, the average forward looking EMRP forecast had increased to 4.0% (as presented in Figure 5.12 below).

Figure 5:12 Survey of US CFO expectations for the EMRP



Source: Duke/CFO magazine survey[87]

[84] Ibbotson and Chen suggest that long-term EMRP that could have been expected given the underlying economies was less than the realised return over the same time period. For example, their analysis points towards a realised return of 6.7% (arithmetic average).
[85] Fernandez, P, Aguirreamalloa, J and Avendaño, L, (2011) "Market Risk Premium Used in 56 Countries in 2011: A Survey with 6,014 Answers", IESE Business School Working Paper No. 920
[86] The PwC UK firm was one of the respondents to the Fernandez survey. PwC currently use an estimate of the long-run EMRP of 5%, however it should be noted that this figure is used for corporate valuation purposes and is not directly suitable for use assessing medium term projected returns.

Fama and French (2002) also estimated the EMRP using dividend and earnings growth model and found that the EMRP based on dividend and earnings growth model, 2.55% and 4.32% respectively, was much lower than the EMRP estimate of 7.43% based on average stock returns between 1951-2000.

Overall, it is difficult to interpret survey evidence, as it is highly dependent upon the survey participants and the form of questioning used. In our 2007 report we concluded that forward looking survey estimates suggested that equity investors required a 3.0% to 4.0% EMRP. While Duke CFO evidence is consistent with this, the Grabowski and Fernandez evidence suggests that forward looking equity premia have risen since 2007. Nonetheless, a reasonable estimate for the ex-ante EMRP might range between 3.0% to 4.5%.

The Dividend Discount Model

One of the most accepted methods of assessing equity market valuations is the Dividend Discount Model (DDM). The DDM assumes that the current share price reflects the present value of all future expected dividends discounted to the present time. Thus with constant dividend growth, an equili ld can be estimated:

$$\frac{D}{P} = r + e - g$$

D/P = Prospective dividend yield
r = Nominal risk free rate
e = Equity risk premium
g = Expected nominal dividend growth rate

This equation can be rearranged to estimate the EMRP using current share prices. We present DDM calculations for the UK and US in Appendix D. Table 5.5 summarises the results.

Table 5.5: Equity market risk premia assumptions, consistent with market valuations at the end of December 2011 (using constant growth DDM)

Country	2007 DDM implied ERMP	2011/2012 DDM implied EMRP
US	3.0	3.4
UK	3.1	5.3

Source: PwC analysis

The implied EMRPs for UK and US equity markets are approximately 0.4 to 2.2 percentage points higher than they were as at November 2007 (3.0% and 3.1%), respectively, reflecting the drop in equity values over this period and somewhat sluggish (real) growth expectations going forward.

By its very nature the DDM tends to provide volatile results. At the end of the credit boom it was suggesting an implied EMRP of 3.0%. This rose to close to 8.0%[88] at the height of the crisis according to some estimates and has now settled, but remains above the adjusted historical estimates provided by DMS.

Other ex-ante studies

Grabowski (2011), among others, suggested that the conditional (i.e. ex-ante based on current market conditions) EMRP can be estimated based on forward looking approaches (ex-ante) and his analysis (as also reported by Duff and Phelps) suggests that a reasonable long-term estimate for the conditional EMRP in the US over the entire business cycle is likely to be towards the top end of the range for the unconditional (long-term historical) EMRP of around 3.5% to 6.0%.

[87] Implied from expectations of the return on the S&P500 index minus the benchmark risk free rate.

[88] See "European Strategy Weekly", 27 October 2008, Nomura

5.2.7 Conclusion on the expected return on equity and the EMRP

Our review shows that there is a very wide range of available estimates for assessing expected returns on equity and the EMRP and we need to draw these together to offer a reasonable estimate for projected returns on equities in the future.

Since our previous report, global equity markets including those in the UK and US have been exposed to significant volatility, hence, it is expected that EMRP estimates based on historical market data or those based on forward looking estimates (such as dividend growth model) will suffer from elevated level of uncertainty and are likely to be particularly challenging to estimate at this point in time.

Over a long period of measurement the average real return on equities have been around 4½% to 6½% with an EMRP of 4.0% to 5½%. The DMS 2011 study suggests that a downward adjustment may be required to historical world EMRP estimates, and that a more reasonable forward expectation of the EMRP is around 3.0% to 3½%. This is broadly in-line with the surveys conducted by the Duke University Fuqua Business School and Graham and Harvey which suggest that City CFOs and others are expecting the EMRPs to lie between 3.0% to 4.0%. This is, however, lower than the evidence quoted by other commentators such as Grabowski (2011) and Fernandez who suggest a likely range of 5.0% - 6.0% for the ex-ante EMRP.

Rather than seek to assess an overall appropriate figure for equity returns, as an intermediate step we have prepared a number of scenarios which seek to bring together the variety of evidence on future equity returns. This seeks to avoid inconsistent combination of different evidence sources. Table 5.6 below sets out some of the plausible options that we consider.

Table 5.6 Return on equity – approaches for equity returns assessment

	Methodology	Real risk-free rate	EMRP	Overall estimate (real returns)
Approach 1	Holistic view of long-term historical returns on equity – abstracting from consideration of individual component parts of equity returns. Based upon long-term UK equity returns	n/a	n/a	4½% - 5½%
Approach 2	Long-term historical EMRP combined with 'normalised' long-term RFR estimates adjusted for the QE and flight to quality effects[89]	1½% - 1¾%	3% - 4%	4½% - 5¾%
Approach 3	DGM based forward looking approach for EMRP combined with current market estimates for RFR	0% - ½%	4½% - 5½%	4½% - 6%

Source: PwC assessment.

Note: Real risk-free rate under Approach 2 is estimated by adding the Bank of England's assessment of the impact of QE, approximately 100 basis points, to our real return on government bonds assumption of 0.5% to 1.0%. Additionally, when estimating the ranges above under approach 2 and 3 we have combined low estimates for the risk-free rate with high estimates for the EMRP to estimate a relatively narrow range for the central estimate for the return on equity. In principle, low estimate for the risk-free rate can be combined with low EMRP estimates which would give a broad range for the overall returns, which may be more instructive in setting low and high ranges around the intermediate rate of return. Our suggested range for the EMRP in approach 3 gives more weight to evidence from the UK, as opposed to the US.

The three approaches above provide reasonably consistent answers, suggesting real equity returns of 4% to 6%. The equity returns have a broader range compared to the figures used in our 2007 report (a range of 4¾% to 6.0% for the real return on equity).

[89] Normalised yields reflect the long-term average estimates for real-risk free rate. Developments within gilts market, as discussed in detail in section 5.1, have lead to declining gilt yields overtime (compared to pre-crisis level) leading to negative spot yields estimates for index-linked gilt securities. Adjusting for flight to quality effects and the government's QE programme (although the latter only impacts nominal gilts), among others, would suggest real risk-free rates, for 10-15 year maturity, were on average close to 1.5% - 1.75% - consistent with estimates used in our previous reports.

In selecting an overall range for real equity returns we are mindful that there may be a degree of optimism across all three approaches. Long-term historic returns are a helpful guide, but if trend economic growth is likely to be lower over the next 10-15 years (as set out in Section 3) then real equity returns are also likely to be lower in future. Approach 2 suggests that returns from equities are insulated from the recent effects in sovereign debt markets. Approach 3 suggests that falls in the risk-free rate are offset by increases in the equity market risk premium, which is supported by a number of studies, but we consider it less likely that actual equity returns achieve roughly a 6% premium over risk-free rates over a 10-15 year timeframe.

We therefore select an overall range for expected real equity returns of 4.0% to 5½ %, which suggests an EMRP of 3½% to 4½% relative to our real government bond yield assumption. While our real equity return assumption is lower than the 2007 report, the EMRP is ½ percentage points higher.

Since much of the overseas equity investment is in the US and Europe and because historic returns in US and Europe have been similar to UK returns, we consider the 4.0% to 5½% figure to be suitable for overseas as well as UK investment (indeed integrating global capital markets would suggest a similar figure should be used across developed markets). Similar to the assumption on the return on government bonds, we consider the range of return on equities incorporates any potential impact of the expectations of exchange rate volatility going forward, and thus we do not explicitly adjust for it. Overall, this implies nominal equity returns of 6½ % to 8.0%, based on expected inflation assumption of 2½% using the GDP deflator. The top end of the range is consistent with the returns implied by the current market – for example taking the current dividend yield on FTSE of around 3.5%[90], expected inflation of around 2½% and GDP growth at around 2.0%[91] suggests a (nominal) market equity return of 8.0%. Nonetheless, our medium-term assessment of return on equities is somewhat lower, as the overall range takes into account the uncertainty around medium-term GDP growth and the weak medium-term outlook for the economy.

5.3 Corporate Bonds

Corporate bond yields generally trade at a premium to the yield on government bonds of comparable maturity, reflecting compensation that corporate debt investors require for the following key factors: systematic risk, probability of default and loss given default and liquidity risk[92]. A number of other factors such as maturity premium might also be reflected in the yield on corporate bonds.

As highlighted in Figure 5.3, developments in global financial markets have also impacted corporate bonds markets, with the added complication that corporate credit risks widened dramatically through the financial crisis. There has since been considerable reversal, back toward pre-crisis levels; indeed the nominal promised rates of return on a BBB rated corporate bond has stabilised at around 6%. In a similar way to equity, the overall debt yields have been more stable than the underlying risk-free rate and corporate credit risk premium.

More recently, the yields on corporate bonds have started to rise again as a consequence of the European sovereign debt crisis and wider economic concerns.

Corporate bonds make up a small (but growing) part of the portfolio of a typical pension fund. In this sub-section we investigate likely expected returns for corporate bonds in comparison to government bonds and equities, focusing particularly on the UK corporate debt market. We review the historic and expected future returns on UK (and US) corporate bonds in-turn below.

5.3.1 Historic corporate bonds returns

In our previous report in 2007, we quoted (from the Barclays Equity-Gilt Study) an average real return for UK corporate bonds over the period 1991 to 2006 of 9.4%, compared to the average real return for UK government

[90] The current dividend yield on FTSE100 and FTSE ALL Share is close to 3.5% based on Datastream.

[91] As a proxy for the growth in dividends, consistent with the evidence in section 3.

[92] For a breakdown of the corporate debt premia refer to Chart 2.22 of the Bank of England's Financial Stability Report, page 28, December 2011.

bonds over the same period of 7.0%, implying average spread of 2.4% per annum. Any data prior to this period was not considered sufficiently robust, particularly given the market for corporate bonds prior to 1991 was very small.

In order to map the trends in UK corporate bonds over time, we continue to rely on the Barclays Equity Gilts Study; however, it no longer reports data on corporate bond returns for the UK since 1991. It provides an estimate for real returns on UK corporate bonds over the last ten years of 2.1%. This suggests that the historic real returns on UK corporate bonds have been in the same ball park as the returns on government gilts of 2.4% over the last ten years – this is not surprising as the premium for investing in corporate bonds is substantially offset by the defaults and situations where investors do not get their investment returned in full (with interest).

In the US, corporate bonds returns averaged around 5.6% over the last 20 years[93], this is exactly the same as the returns on US government bonds over the same time period.

5.3.2 Future corporate bond returns

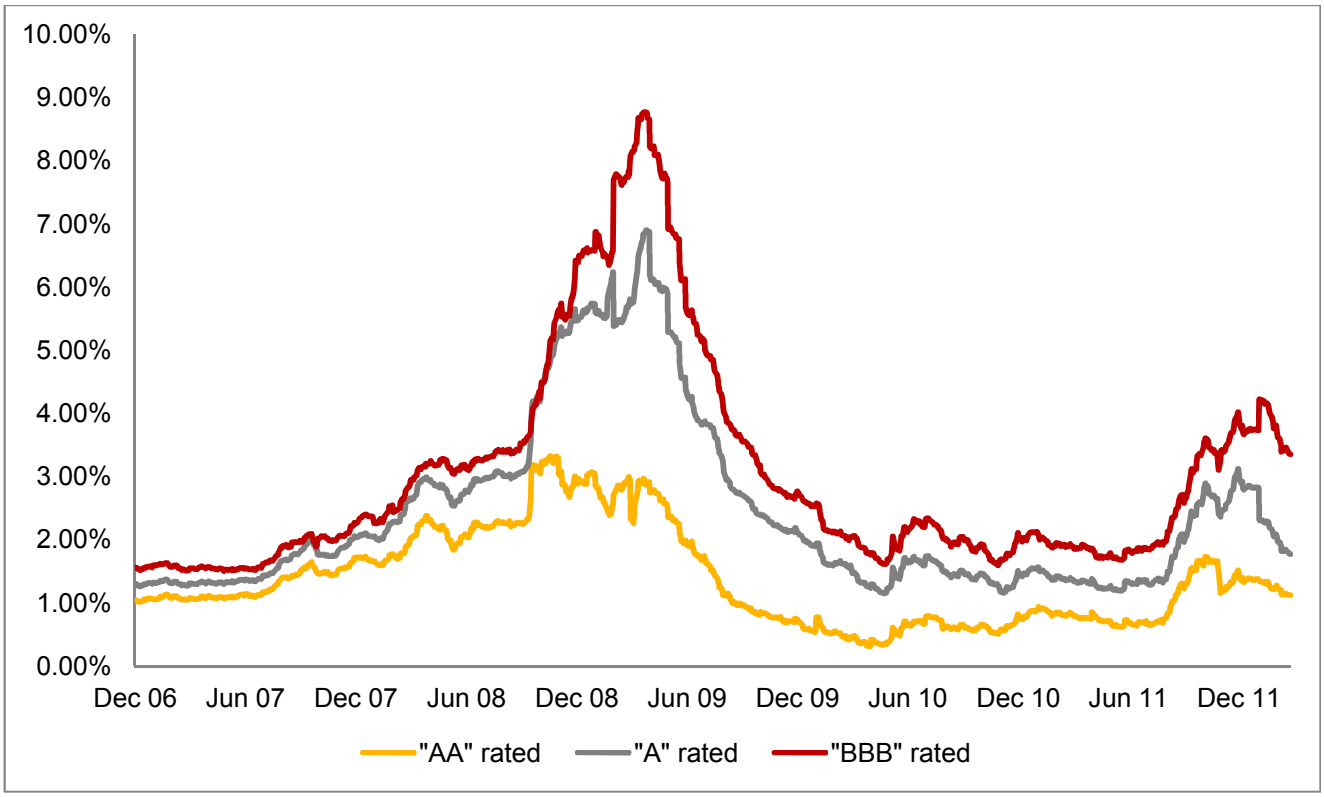
The historic performance of corporate bond returns is a guide to the returns that have been achieved, however, the best estimate of future expected returns can be obtained from the traded corporate bond investments. Corporate bonds are rated by different ratings agencies (such as S&P, Fitch or Moody's) from investment grade to junk grade, where the rating provides an indication of the expected probability of default. The yield to maturity for corporate bonds varies by rating, with higher rated investment grade bonds trading at lower margins above government bond yields. A typical UK corporate bond is rated at lower end of the investment grade threshold at BBB, but some funds may concentrate investments in better rated corporate bonds.

Consistent with our 2007 report, the forward looking debt premium and hence, the expected future return for corporate bonds, can be calculated using two comparable approaches – an implied market-pricing approach and a decomposition approach. Under the former, the future expected returns are based on the promised yields adjusted for expected default losses. The latter estimates the debt premium as the product of the debt beta and the EMRP. The debt beta represents the systematic risk of a debt security i.e. its correlation of its returns with broader market movements, whereas, the EMRP (as discussed above) captures the return investors require for investing in the equity market (over and above the risk-free rate). We provide an assessment using these two approaches below.

Figure 5.13 below, shows spread over government bonds across different ratings of UK corporate bonds between December 2006 to February 2012.

[93] Barclays Equity Gilts Study, page 97, February 2011.

Figure 5.13: Historic spread over UK government for corporate bonds of different ratings



Source: Datastream (using Merrill Lynch indices)

The current spread on a BBB rated UK corporate bond is around 3.4%. Similar estimates on A and AA rated bonds are lower at 1.8% and 1.1%, respectively. Given the current distortions in the government bonds markets, it would be appropriate to use historical averages as a more reliable estimate for the expected spread going forward under the implied market-pricing approach. In the current context, we use a 2 year historical average, as this represents a balanced view which appropriately weighs current spot estimates with previous years of relative stability, however, stops short of incorporating the extreme volatility in yield on corporate bonds due to the impact of the financial crisis. The 2 year average spreads for BBB, A and AA rated bonds are currently 2.3%, 1.7% and 0.9%, respectively. It is likely that as market conditions return to their long-term averages, the returns on corporate bonds will also trend back from their currently higher positions.

Compared to government bonds, corporate bonds are more exposed to default risk[94] as there is an inherent risk that the issuer can go bankrupt and thus default on the bond. This means that the calculated yield to maturity represents a "promised" yield, rather than a true expected return, as any defaults will reduce the actual return below the promised yield[95]. However, it is worth noting that higher rated corporate bonds are less likely to default – for example AAA rated bonds have very low default probabilities and in some cases have yields that are only slightly below Sovereigns' – who, if needed , can back their liabilities through using fiscal and monetary policy tools (such as increasing tax rate, expansionary monetary policy etc). In any case, to estimate a future expected return the expected default risk premium must be deducted from the spread on corporate bonds. It is possible to estimate the effect of default risk, through expected default probabilities and recovery percentages, which are provided by Moody's[96] and Standard and Poor's. However the growth of the credit default swap (CDS) market has allowed greater visibility of the "price" of default risk. Recent financial market uncertainty has impacted the traded spreads on such credit instruments, for example representative UK corporate firms with

[94] Sovereign bonds across some jurisdictions (for example Greece and Ireland) have also been particularly exposed to default risk.

[95] Due to lower, if any, repayments of interest or principal

[96] Corporate Default and Recovery Rates, 1920-2006, Moodys.com, February 2007.

ratings of A/A- and BBB+/BBB on average had CDS spread of around 40 to 70 bps[97] prior to 2008, however, during the crisis the CDS spreads for such ratings increased markedly[98] and the current typical spread for a UK corporate has been around 100 to 120 bps[99]. The 2 year historical average CDS spread across these ratings has been around 100 to 110bps.

The default risk adjusted debt spreads can be estimated in relation to both the current (i.e. spot) as well as historical average spreads. In relation to the former, by reducing the current spreads over government bonds for a BBB rated long-term corporate bond of 3.4% by a CDS spread of 120bps, we can estimate the expected future return for a BBB rated corporate bond at around 2.2% above government bond returns. Similarly, an A rated corporate bond with a lower current spread of 1.8% over government bonds can be reduced by a smaller CDS spread of 100bps to give a figure of 0.8%.

In contrast, using historical averages suggests that reducing the 2 year historical average spread of 2.3% over government bonds for a BBB rated long-term corporate bond by a 2 year average CDS spread of 105bps, the expected future return for a BBB rated corporate bond can be estimated at around 1.3% above government bond returns. Similarly, an A rated corporate bond with a lower historical spread of 1.7% over government bonds can be reduced by a smaller average CDS spread of 100bps to give a figure of 0.7%.

Using current estimates, the return for corporate bonds above UK government gilts is expected to be in the region of 0.8% to 2.2%, whereas historical averages suggest a lower debt spread range of around 0.7% to 1.3%. Currently, the expected return on corporate bonds offers a margin above government gilts, in particular due to low yields on the latter, thus we adjust slightly upwards the lower debt spread range based on historical averages to use an overall debt spread range of 1.0% to 2.0%.

The alternative decomposition approach calculates the debt premium as a product of the debt beta and the EMRP and with possibly inclusion of an illiquidity premium. Many empirical studies, as well as assessment of the regulatory cost of capital in the UK, have shown debt betas to be stable around the 0.1-0.2 level, as set out in Appendix F.

Multiplying the debt betas by an EMRP of 4½% to 6.0%[100], results in a expected debt premium ranging from0.5% to 1.2%. There is evidence to suggest current market pricing is providing an additional illiquidity premium for long-term bond investors. The Bank of England decomposition of bond yields suggests that a residual premium (including illiquidity) may be worth a further 1.0% to 1.25%[101], taking the total expected premium to between 1½% and 2½%, and this broadly reconciles with our earlier approach.

Overall, taking the estimates from the implied and the decomposition approaches, our analysis suggests an expected return for corporate bonds above UK government gilts ranging between 1% to 2%, with the higher figure more applicable when combined with a very low government bond yield. This is an increase on our assessment in 2007, which assumed a return of 1% above UK government banks, but this is largely as a consequence of very low government bond yields, rather than higher returns available for this asset class. Moreover, the increase in part also reflects the potential impact of developments in the UK banking sector, which is facing both funding and regulatory capital challenges, both of which may increase the cost of loans. Such an increase in bank lending could spill into corporate bond markets. It is difficult to quantify the precise impact of such a development; however, in our opinion the overall proposed range of the spreads for corporate bonds (over and above government gilts) essentially includes such a reversion after very low corporate credit spreads prior to the financial crisis.

[97] A rated Tesco CDS spread was 48bps and BBB rated BSkyB CDS spread was 70bps, as of December 2007, based on Datastream data.

[98] For example, the CDS spreads on Tesco and BSkyB peaked at 170bps and 279bps in December 2008.

[99] A- rated Tesco CDS spread is currently 110bps and BBB+ rated BSkyB CDS spreads are currently 120bps based on Datastream data.

[100] As the credit spread has been calculated with reference to current Government bond yields, it seems more appropriate to use our 3rd approach to assessing equity returns (Table 5.6), with its higher EMRP range.

[101] Bank of England, "Financial Stability Report", chart 2.2, page 28, December 2011.

Overall, we suggest real corporate bond returns of 1½% to 3%, using real government bond returns of ½% to 1.0% and nominal returns of 4.0% to 5½% based on a GDP deflator assumption of 2½%. The real and nominal corporate bond returns are lower than our recommended assumptions in 2007, reflecting low yields on real government bonds and slightly lower underlying expected inflation assumption.

5.4 Property

Property makes up a relatively small proportion of total investment fund assets compared to equities and bonds. Furthermore, property suffers from poor liquidity which makes direct comparison with equities difficult. In this sub-section we present historical and expected future returns on property investment.

5.4.1 Historic returns

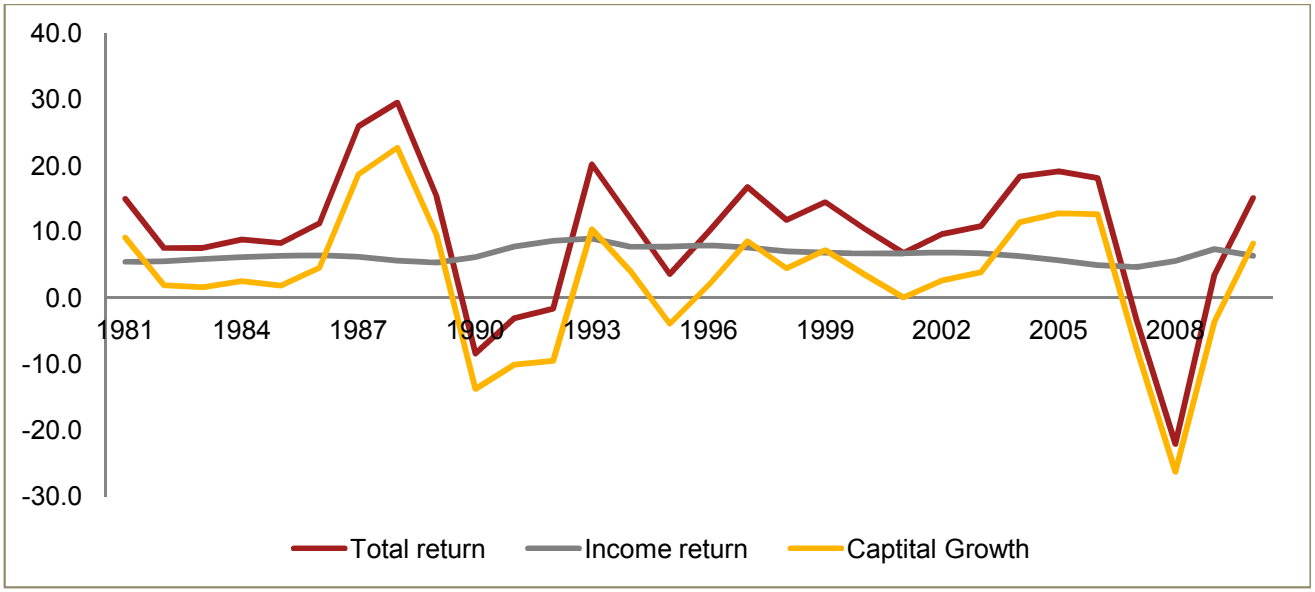
Consistent with other asset classes, particularly equity and corporate bonds, property was also severely impacted by the volatility in financial markets.

Property assets had peaked following the gradual increase in prices since 2001 (see Figure 5.12 below) and a period of uninterrupted capital growth since 1992, but the bursting of the UK property bubble and the financial crisis have combined to drive negative returns on property assets since our previous report in 2007.

We have examined the nominal total return on UK property based on data on commercial, industrial and retail properties tracked by Investment Property Databank (IPD)[102]. In our 2007 report, we showed that the mean nominal return on property was 11.5%, which covered the period from 1981 to 2006. The updated mean nominal return for the period 1981 – 2010 is now lower at 9.7%.

IPD data also allows us to examine how total return on UK property is divided between capital and income returns on a nominal basis. In the chart below we show the capital and income components of the total return. As reflected in figure 5.14, the total return on property assets declined sharply in 2007 as capital growth dipped significantly following the turmoil in financial markets. However, over time the income return from property assets has remained stable – nonetheless this forms a small part of the aggregate total returns.

Figure 5.14 Annual nominal returns on UK property



Source: IPD digest 2011, PwC analysis

[102] IPD, "UK Property Investors Digest 2007", 2007

5.4.2 Future Returns

Historical returns on property assets are unlikely to be a good indicator for future returns, and although the mean annual return is 9.7%[103], there is significant deviation around that over time. For example, in the period since our previous report the mean annual return has been -1.7%.

Medium-term forecasts for commercial property are not readily available. Residential house price growth may be an indicator of broader property markets, but is subject to considerable uncertainty over the next five years as with other macroeconomic variables. The average of the independent forecast for house price growth in 2012 is -1.22[104], essentially indicating a small reduction in prices next year, which is in accordance with both the Nationwide and Halifax outlooks. However Table 5.7 shows that there is considerable disagreement among leading forecasters about future growth in house prices with the forecast range for 2012 being more than 10 percentage points wide.

Table 5.7: Forecasts of residential house price growth

% house price growth	2012	2013	2014	2015	2016
Independent average	-1.22	0.58	3.20	5.03	6.38
Range of independent forecasts	-5 to 2.4	-5.1 to 6.6	-0.6 to 7.1	1 to 10	2 to 13.86
NIESR	-0.8	-1.7	0.2	1.6	2.7
OBR	-0.4	0.1	2.5	4.5	4.5

Source: HM. Treasury (November 2011). Forecasts for the UK economy: a comparison of independent forecasts; OBR(March 2011).Economic and Fiscal Outlook

In the long run (between 2017 and 2027) we expect residential house prices to grow in line with average earnings at approximately 4¼%. This is a modest rate compared to estimates before 2007, for example house price growth was 12.2% on the Nationwide index between 1997 and 2006.

Overall, and as in our previous, report we believe that the most appropriate method of estimating the likely future returns on property assets is through assessing where property as an asset class is located on the risk spectrum, relative to equities and bonds. We retain the view that the risk profile of property will fall between equities and corporate bonds for the following reasons:

- Property returns are generally more volatile than corporate bond returns, but less volatile than equities; and
- Property companies generally have low asset betas, on average, reflecting their low systematic business risk compared to equities, but undoubtedly carry greater risk than government bonds[105].

We therefore recommend an expected return on property between those from equities and bonds, and we assume a spread over government bonds of 2½% to 3.0%, over a 10-15 year time period. This implies a real return on property of 3.0% to 4.0%, assuming real government bond returns of ½% to 1.0% and nominal returns of 5½% to 6½% based on a GDP deflator assumption of 2½%.The real and nominal returns on property are lower than our estimates in 2007, reflecting lower inflation expectations and real returns on government bonds.

5.5 Conclusion: Investments returns

Our analysis of the historic and forward looking studies suggests that the following projected returns are reasonable central estimates over a 10-15 year time period.

[103] Calculated on an arithmetic basis from IPD data

[104] Calculated from data from Table 5.7

[105] See Appendix E.

Table 5.8: Medium-term investment returns assumptions

Recommended assumption	2007 (%)	2011 (%)	Change in percentage points
Inflation: RPI (2007), GDP deflator (2011)	2¾	2½	– ¼
Real government bond returns	1¾ – 2	½ – 1	– 1¼ to – 1
EMRP	3.0 – 4.0	3½ – 4½	+ ½
Real equity returns	4¾ – 6	4 – 5½	–¾ to – ½
Real corporate bond returns	2½ – 3	1½ – 3	– 1 to 0
Real property returns	3¾ – 4	3 – 4	–¾ to 0
Nominal government bond returns	4½ – 4¾	3 – 3½	– 1½ to – 1¼
Nominal equity returns	7½ – 8¾	6½ – 8	–1 to – ¾
Nominal corporate bond returns	5¼ – 5¾	4 – 5½	–1¼ to – ¼
Nominal property returns	6½ – 6¾	5½ – 6½	–1 to – ¼

Source: PwC analysis, Datastream, Barclays Equity Gilts Study, OBR forecasts and Capital IQ.

Note: Nominal returns on government bonds are estimated by combining inflation with real returns.

We combine these investment return assumptions into overall portfolio returns, using a number of portfolio compositions, as suggested in Section 4.

Table 5.9: Projected return for representative portfolios[106]

Portfolio composition	Projected return (Nominal, bottom of central range)	Projected return (Nominal, centre of central range)	Projected return (Nominal, top of central range)
67% equity / 33% government bonds	5.4%	5.9%	6.5%
57% equity / 33% government bonds / 10% property	5.3%	5.8%	6.4%
57% equity / 23% government bonds / 10% property / 10% corporate bonds	5.4%	6.0%	6.6%
50% equity / 30% government bonds / 10% property / 10% corporate bonds	5.1%	5.7%	6.3%

Source: PwC analysis.

The central estimate for the range of projected nominal returns of 6.0% (rounded to the nearest quarter) is lower than the comparable estimate of 6½% in our 2007 report. The central estimate is based on a portfolio allocation of 57% equities, 23% government bonds and 10% each for corporate bonds and property. The allocation to equities and government bonds is consistent with evidence across life insurance companies and pension funds, in principle giving greater weight to equity allocation for pension funds when considering the overall asset allocation towards equities.

Although the asset mix on average has remained fairly stable, the decline in projected returns since 2007 is explained by a combination of factors: (i) expected GDP and earnings growth forecasts are lower reflecting weaker outlook for the economy, (ii) we have used the GDP deflator as an appropriate measure of expected inflation, which is lower by ¼% compared to RPI, (iii) real government bond yields have fallen by 1.0% to 1¼% due to flight to quality effects and broader developments in the gilts markets, (iv) projected equity returns have declined, but not by as much as expected bond returns and (v) real returns on corporate bonds and property are

[106] Other asset classes such as hedge funds, commodities etc, provide scope of increased returns for certain amount of risk, nonetheless they represent a small proportion of the overall asset base and hence, are not specifically considered in the current context.

lower by 1.0% and ¾% at the bottom end of their respective ranges – consistent with trends across other asses classes due to broader macro-economic developments.

6 Tax Effects

Here, we assess for each asset class the likely effect of UK taxation of income and capital gains on investment returns. In practice, the actual tax effect may differ from the assumptions set out below due to company and fund-specific circumstances. The calculations set out here are best estimates based on current UK tax law and practice.

We consider the impact of tax on gross returns from those products where tax applies. We consider this in context of the current 5%/7%/9% rates for tax advantaged business. Additionally, for completeness we also review the 4%/6%/8% rates when analysing likely tax implications[107] for portfolio returns. If the rates were to change following our report, it might be necessary to reconsider the impact of tax.

6.1 Overview

Pensions and ISAs are tax advantaged and although the underlying investments may have suffered a variety of withholding taxes on dividends, for example, no further taxes are payable on the products themselves until, in the case of pensions, income tax is paid on the pension paid. Projections, however, show the full income that a pension provides, as the individual subsequent income tax is then for the customer to assess.

Under the Market in Financial Instruments Directive (MiFID), from 1 November 2007 unit trusts are no longer subject to the requirement to use the projection bases laid down by the FSA, although some providers of such products might well decide that the FSA bases are reasonable for their purpose. However, we exclude them from our consideration here.

The main taxed product to consider, therefore, is the tax position of a net life fund, which currently pays 20% tax on capital and income, apart from dividends received from equity investments, which are generally exempt from UK tax.

The mix of assets will vary hugely between differing companies and funds. A large degree of equity investment is a common feature of many products but the same projection rates apply whether the funds are fully equities or 2/3 equities 1/3 bonds. To show the impact of tax we have considered a balanced fund consisting of 2/3 equities 1/3 bonds, taking a proportion of overseas equity investment into account.

In the analysis below, we look at the effect of the various tax regimes on the rates of return. The gross rates vary by asset class and we have adopted rates for the purpose of this analysis consistent with our analysis in section 5 above. For government bonds, we use a rate of 3¼% per annum in the central scenarios, with upper and lower bounds of 4¼% and 2¼% respectively; similarly for equities (UK and overseas), we use a central assumption of 7¼% per annum with upper and lower bounds of 9¼% and 5¼% respectively. When aggregated to give the portfolio returns, the average returns are close to the assumptions used in Table 6.2 below.

Where an assumption for price inflation is needed, we have used 2½% (consistent with the rates in Table 5.8 of this report) and where different rates apply to equity capital gains and income, a dividend yield of 3½% is assumed for UK equities and 2.0% for overseas equities, with a rate of rental income of 5.0% on UK property. These rates are the same for all three scenarios, meaning that the real capital gains range from 0% to 6% per annum.

[107] The 4%/6%/8% represents a 2% spread consistent with the current FSA illustration rules of 5%/7%/9% around our recommend returns assumption of 6% for the weighted portfolio.

6.2 Taxed business

Investment return on life business (such as endowments and high income bonds) is taxed during the life of the policy. The tax rate applied depends upon the type of return (we assume here that all life business investments are held directly – the treatment of holdings via unit trusts or OEICs can be more complex):

- All income from portfolio equity investments is exempt, whether the equities are UK or overseas;
- All income on property is taxed at a rate of 20%. Therefore, the net return on property is 80% of the gross income.
- Total returns on bonds (UK and overseas) are taxed at a rate of 20% per annum. This figure is applied to the assumed 3.25% growth rate of bond holdings to give a net growth rate of 2.6%.
- The above figures assume that full relief is available for withholding tax in the paying company.
- Capital gains on UK equity, overseas equity and property are currently taxed at a rate of 20% less an allowance for indexation which is based upon the movement in the Retail Prices Index (RPI) between acquisition and disposal of the equity holding.

The calculation for capital gains tax on UK equity, overseas equity and property in a life fund can be rather involved. Gains are taxed at a rate of 20% less an allowance for indexation which is based upon the movement in the Retail Prices Index between acquisition and disposal of the equity holding. Therefore, the longer these assets are held by a life company, the greater is the tax allowance against the gain and the lower the actual rate of tax paid (assuming that inflation is positive). In order to determine an average rate of tax on chargeable gains, it is necessary to assume a rate of equity churn (i.e. a rate of trading of equity). HMRC's assumption for the purposes of taxing life company holdings in unit trusts is seven years (which represents a reasonable average length of holding), and we have used this in our calculations. We have used the following approach to determine the adjustment that should be made to gross returns to allow for capital gains tax:

- A notional portfolio of equities is projected forward over a seven-year period, increasing in line with the appropriate return assumption.
- One-seventh of the portfolio is then assumed to be sold each year and immediately reinvested.
- This amount is then reduced to allow for indexation (i.e. the assumed increase in RPI).
- Tax is calculated as 20% of this amount.
- The total amount of tax over the seven-year period is calculated as the sum of the tax due in each of the seven years, and this total is divided by the total capital gain over the period to give an average annual rate of tax.
- This average tax rate is then multiplied by the assumed annual capital growth to give the reduction from the gross return in respect of capital gains.

On UK equities, the purchase of equities gives rise to a 0.5% stamp duty charge. For modelling the impact of this, we assume that an equity portfolio is sold and replaced every seven years which translates to a decrease in growth rate as a result of the stamp duty effect of 0.08% per annum. We have assumed that this small cost is implicitly allowed for in the gross rate set for projections and so no additional deduction is made when arriving at the net rate. The assumed returns on property investment are similarly assumed to be net of the impact of stamp duty land tax.

This leads to the following analysis of the impact of tax for different portfolios:

Table 6.1: Effective tax rates for life funds in excess of those allowed for in tax advantaged business

UK equities	Low	Mid	High
Assumed gross rate of return	5.25%	7.25%	9.25%
Assumed inflation	2.50%	2.50%	2.50%
Assumed income	3.50%	3.50%	3.50%
Additional deduction for tax in life fund	0.00%	0.26%	0.68%

Government bond income and growth	Low	Mid	High
Assumed gross rate of return	2.25%	3.25%	4.25%
Additional deduction for tax in life fund	0.45%	0.65%	0.85%

Overseas equities	Low	Mid	High
Assumed gross rate of return	5.25%	7.25%	9.25%
Assumed inflation	2.50%	2.50%	2.50%
Assumed income	2.00%	2.00%	2.00%
Additional deduction for tax in life fund	0.16%	0.58%	1.00%

Table 6.2: Impact of tax on sample life funds

Mixed fund (one-half UK equities, one-sixth overseas equities, one-third government bonds)						
Approximate gross return	**4.0%**	**5.0%**	**6.0%**	**7.0%**	**8.0%**	**9.0%**
Additional deduction tax on UK equities	0.00%	0.00%	0.13%	0.29%	0.34%	0.61%
Additional deduction tax on government bonds	0.15%	0.20%	0.22%	0.22%	0.28%	0.23%
Additional deduction tax on overseas equities	0.03%	0.04%	0.09%	0.14%	0.17%	0.25%
Total tax impact	0.18%	0.24%	0.44%	0.65%	0.79%	1.09%

6.3 Conclusion: Tax effects

Life funds bear tax on income and capital gains. Our analysis suggests that for a typical mixed fund, the reductions in respect of tax from the illustration rates of 5%, 7% and 9% in current use might vary from 0.24% for the lower illustration through 0.65% for the central assumption to 1.09% for the higher illustration. For completeness, we also report the tax implications of using 4%/6%/8% rates when estimating projected returns – which suggest a range of 0.18% to 0.79%, with a mid-point of 0.44% for the associated tax reductions. However, it should be noted that asset allocation, rate of churn, rate of return and proportion of return derived from income all have an effect on the tax payable.

7 Conclusion

7.1 Summary and conclusion to the report

In this Section we review the three questions asked by the FSA.

1. **Does the current intermediate rate of return continue to represent the appropriate single rate for illustrating potential returns for those products subject to the projection rules?**

   Following our review of academic research, updated market information and broader economic developments, our best estimate for the single intermediate rate of return is 6%, in nominal terms, with a range around this figure of 5¼% to 6½%. We therefore consider the current 7% intermediate figure to be too high and suggest the FSA brings this figure down to within the range of 5¼% and 6½%.

   In this report we have not reviewed the high or low rates of return around the intermediate rate of return.

2. **Is there reason to doubt the appropriateness of the 1% adjustment for tax-disadvantaged products?**

   The appropriate adjustment for tax-disadvantaged products should depend upon the projection rate it is applied to. An adjustment of 1% is at the top end of our analysis, particularly for a 9% intermediate rate of return assumption.

   If a single adjustment figure for tax-disadvantaged product is required, in the case of a 6% intermediate rate of return assumption, we recommend a figure of ½%.

3. **Do the long-term inflation assumptions of 2½% for prices and 4% for earnings continue to be valid?**

   We use a figure of 2½% for the GDP deflator as the measure of price inflation embedded within our intermediate rate of return assumptions. However, for the purpose of preparing retail projections, we recommend long-term assumptions of 2% for CPI and 3¼% for RPI. A figure of 4% for nominal earnings growth remains appropriate.

Appendix A. - Terms of reference

STATEMENT OF REQUIREMENTS

Review of FSA projection rates

2011

1. Customer

The Financial Services Authority (FSA) is an independent non-governmental body, given statutory powers by the Financial Services and Markets Act 2000. The FSA is a company limited by guarantee and financed by the financial services industry. The Treasury appoints the FSA Board, which currently consists of a Chairman, a Chief Executive Officer, three Managing Directors and 9 non-executive directors (including a lead non-executive member, the Deputy Chairman). The Board sets out overall policy, but day to day decisions and management of the staff are the responsibility of the Executive.

The FSA's main offices are located in The North Colonnade, Canary Wharf where the majority of the approximately four thousand staff are located. There are also separate offices in One Canada Square, Canary Wharf, and offices in Edinburgh.

The FSA has been given a wide range of rule-making, investigatory and enforcement powers in order to meet its four statutory objectives of:

- market confidence: maintaining confidence in the financial system;
- public awareness: promoting public understanding of the financial system;
- consumer protection: securing the appropriate degree of protection for consumers: and
- the reduction of financial crime: reducing the extent to which it is possible for a business to be used for a purpose connected with financial crime.

The overall aim of the FSA is to promote efficient, orderly and fair markets and to help retail customers achieve a fair deal.

Recent developments

You will probably be aware that the FSA's prudential and conduct of business supervisory functions will be separated, with the majority of its prudential activities moving to form a new subsidiary of the Bank of England (called The Prudential Regulation Authority), and with our conduct of business activities moving to a new and powerful Financial Conduct Authority. These changes are expected to occur in early 2013. Until then the FSA will continue to perform its existing functions.

2. Background

The FSA prescribes how firms calculate projections of future benefits. We also prescribe the situations in which firms must or must not provide such information to retail customers. Projections are used both for long-term investment products and shorter-term investment products, although the rules were designed with long-term investments in mind.

Projected values of future benefits are also used by firms to disclose the effect of charges over time, i.e. to provide an indication of returns net of charges.

To counteract potential misinterpretation of the projection figures, and to present the customer with an indication of growth rate sensitivity of possible outcomes, our rules require firms to project using three different rates (the upper rate and lower rate are simply + and - 2% from the intermediate rate and do not represent information on asset volatility). The current rules also require firms to use rates of return 1% lower for those products subject to a heavier tax liability such as life policies.

The prescribed rates of return which firms must use are listed in our Conduct of Business Sourcebook (COBS) and we are committed to periodically reviewing their appropriateness. These rates make no reference to the actual assets underpinning a particular product, but firms are required to revise the prescribed rates downwards where a product is unlikely to achieve returns in line with those indicated by the standard rates. (An asset mix of 70% equity and 30% bond was felt to provide reasonably indicative figures in the 2003 and 2007 reviews.)

3. **The provision of consultancy services**

Previous review

The assumptions were last reviewed in 2007. PwC were contracted to provide the following:

- a central estimate and distribution information for annualised real returns for UK equities, international equities, property, gilts and corporate bonds over the next 1, 5, 10, 15 and 25 years;
- a central estimate and distribution information for annualised nominal returns for UK equities, international equities, property, gilts and corporate bonds over the next 1, 5, 10, 15 and 25 years;
- decomposition of these returns into capital and income;
- details of the assumptions that have been made in deriving the above and an explanation of the methodology used;
- price and earnings assumptions;
- opinion and analysis of the main influences on total returns from the various asset classes over the different time periods; and
- a summary and analysis of recent relevant research.

Scope & approach

The present contract is aimed at establishing:

- whether the current intermediate rate of return continues to represent the appropriate single rate for illustrating potential returns for those products subject to the projection rules;
- the appropriateness of the 1% adjustment for tax disadvantaged products; and
- the continuing validity of the long-term inflation assumptions of 2.5% for prices and 4% for earnings.

We require a review of the relevant values arrived at in 2007. We believe that the methodology adopted in 2003 and 2007, incorporating the peer reviewers' comments, is robust. That methodology should only be diverted from where there is a compelling reason for believing that it is no longer appropriate.

Please note; it is our intention that that this report will also be subject to peer review.

We also require the report to provide a detailed explanation should the recommended rates assume a different proportion, i.e. the report should state why these rates are appropriate for a managed fund or an open with-profit fund.

Any recommendations should comment on the continuing appropriateness of the following factors and any resultant departure from these factors should be accompanied by a detailed explanation:

Recommended Assumption	**2007 rate (p.a.)**
Inflation (RPI)[108]	2¾%
Real earnings growth	1½%
Nominal earnings growth	4¼%
Real government bonds return	1¾% to 2%
Real equities return	4¾% to 6%
EMRP	3% to 4%
Nominal government bond return	4½% to 4¾%

[108] We will expect the supplier to also comment on the consumer price index (CPI) inflation measure.

Nominal equities return	7½% to 8¾%

All analysis must be conducted with an understanding of the degrees of approximation which are appropriate. The intermediate rates of return which the FSA prescribes need principally to be appropriate for the broad asset classes as typically constitute UK retail investment business. The review of these rates needs to be proportionate to the inevitable approximations this entails.

Although we expect a concise report, we also expect any recommendations to be supported with an appropriate rationale and details of the scope of any proposed changes must be made clear.

We reserve the right to call for more detailed exposure within the report of the supporting rationale, assumptions made, and methodology adopted.

Deliverables / Tasks

The FSA requires the following deliverables:

- A draft report, the structure and content of which is to be agreed with FSA, including, but not necessarily restricted to coverage of (a) methodology (b) assumptions (c) analysis (d) results and (e) the limits to these.
- A final report in a form suitable for publication as a stand-alone document, the structure and content of which is to be agreed with FSA, including but not necessarily restricted to the elements outlined above (draft report).

4. **Reporting / Contract Management**

The day to day management of the project will rest with the CBU-Policy-IPD-Investment Distribution and Disclosure Team. The designated contacts are:

Name	Role	Telephone
Richard Taylor	Assignment Manager	020 7066 5978
Don Cranswick	Project Manager	020 7066 5578

The FSA will expect to have regular meetings/discussions, with all of the parties involved, to discuss progress of the project.

5. **Essential skills and attributes**

- an understanding of the function and content of FSA conduct of business rules which prescribe the basis for projecting assumed future benefits and the effect of charges;
- a knowledge of, or ability to analyse, those investment products sold in the UK retail market which are subject to the FSA projection rules;
- a thorough understanding of academic and industry research regarding medium- to long-term forecasting of rates of return;
- a solid understanding of the broad economic and financial issues and themes which impact upon medium- to long-term forecasting of rates of return;
- access to relevant economic and actuarial expertise (academic or professional);
- a thorough understanding of the tax treatment of these investment products; and

- demonstrate the ability to build and sustain good relationships with FSA.

Appendix B. - RPI-CPI wedge

There are four main components that account for differences between RPI and CPI:

- **The formula effect:** the CPI uses both the arithmetic and geometric mean to aggregate basic prices, whilst the RPI uses only the arithmetic mean.
- **Housing costs:** the RPI and RPIX include housing costs such as owner-occupiers' housing depreciation, council tax, rents and rates. The RPI further includes mortgage interest payments. The CPI currently includes just rents.
- **Other differences in coverage:** CPI includes a number of components which are not included in the RPI and RPIX such as brokerage fees and overseas students' tuition fees. The RPI and RPIX include vehicle excise duty, trade union subscriptions and TV licence fees which are not currently included in the CPI. The calculations of car prices also differ across the indices.
- **Differences in weights:** The weights given to the components of each index also vary as different sources of data and different populations are used to construct the weights. In this appendix we review the component parts of the RPI-CPI wedge and

In this appendix we review these main components of the wedge between RPI and CPI and how they are likely to evolve.

The formula effect

Before 2010 the formula effect generally accounted for around 0.5 percentage points of the wedge, since 2010 that has increased to 0.8 and is now to around 1. The average in 2005-11 was around 0.6 (see Table A1 below).

Table A1: Composition of the wedge between RPI and CPI

	Recent (October 2011)	Average (2005 - 2011)	Standard deviation (2005 -2011)
Formula effect	1.0	0.6	0.2
Housing (excl.MIPs)	-0.1	0.3	0.4
Other differences in coverage	-0.2	-0.1	0.1
Other differences including weights	-0.3	-0.3	0.3
Total RPIX - CPI wedge	**0.6**	**0.6**	**0.6**
MIPs	0.0	0.0	1.1
Total RPI - CPI wedge	**0.4**	**0.5**	**1.5**

Source: OBR (2011). Working paper No.2:.The long-run difference between RPI and CPI inflation

Notes: The average and standard deviation are calculated from Jan 2005 to October 2011. In 2005 the ONS changed the methodology which it uses to calculate the contributions to the wedge, designed to provide a more accurate breakdown as shown here. Columns may not add up exactly due to rounding to 1 decimal place of the published data and because the wedge between RPI/RPIX and CPI is calculated separately from the components of the wedge – leading to small discrepancies between the overall wedge and the sum of components.

Changes in the way that prices of clothing are collected since January 2010 have contributed to increases in the formula effect[109] because they mean that prices are more dispersed. This tends to lead to a higher measure using the arithmetic mean as opposed to the geometric mean and therefore increases RPI relative to CPI. The formula effect continued to increase into 2011 suggesting that the impact of the changes on the formula effect of the changes were persistent, although it now seems to have stabilized at around 1 percentage point.

[109] ONS Information Note, *Consumer Prices Index and Retail Prices Index – analysing differences.*

The ONS is currently undertaking a review of methods used to measure clothing prices in the UK, which could mean further changes to the wedge. Notwithstanding this the OBR finds it sensible to change the assumption used for the formula effect to between 0.8 and 1. This assumption also seems reasonable for the present report.

Housing

Changes in housing costs can have a substantial impact on the wedge between RPI and CPI, as the former includes housing depreciation, mortgage interest payments, council tax and transactions fees and rents, whilst the latter include only rents. Historically the contribution of housing to the wedge has varied with house prices and even though housing is currently contributing negatively to the RPI-CPI wedge, in the past it has tended to contribute positively as house prices have grown faster than other commodities. This trend may well continue, although house price growth will probably be more subdued than in recent decades, particularly in the short-term. Housing costs excluding mortgage interest payments are likely to contribute 0.35 to the wedge according to the OBR estimates, in part due to their increased weighting in the RPI index.

The contribution of mortgage interest payments is likely to increase as interest rates eventually rise from the historic lows of the past 3 years. The OBR estimate this contribution to be around 0.15 percentage points in the medium to long run, although this is subject to considerable uncertainty and volatility in practice.

Weightings and coverage

The effects of weighting and other coverage are hard to predict but the best assumption appears to be that their net impact will be around zero. Between 2005 and 2011 they reduced the wedge by -0.4 percentage points, but many of the differences in coverage are set to be eliminated. The ONS currently propose the inclusion of Vehicle Excise Duty, TV license fees and trade union subscriptions in the CPI. These items are already included in the RPI. Different measures of car prices are used in the two indices, the RPI uses prices imputed from prices of used cars and the CPI uses list prices of cars. Since 2002 vehicle prices have risen faster in the CPI than the RPI, although in 2009 that trend reversed dramatically, adding to the volatility in the RPI-CPI wedge in recent years. The ONS expects that in future the two series will converge and follow the same trend. Moreover, there are plans for a new measure which will eliminate any differences between new car prices in the RPI and CPI. Differences in weightings typically contributed small amounts to the wedge and the OBR analysis does not suggest that this effect can be expected to be material on average in the future.

RPI inflation outlook

If we sum all of the components of the wedge from the OBR analysis we get a central estimate of 1.4 percentage point for the RPI-CPI wedge (Table A2).

Table A2: OBR estimates of the RPI-CPI wedge in future

	Central estimate	Range
Formula effect	0.9	0.8-1.0
Housing (ex. MIPs)	0.35	0.35
Coverage	0	0
Differences in weights	0	0
MIPs	0.15	0.15
Total RPI - CPI Wedge	1.4	1.3-1.5

Source: OBR (November 2011)

Appendix C. - Literature review on ERP studies

This appendix is not meant as an exhaustive and authoritative examination of all literary publications on the subject of the EMRP, it is instead meant as a guide to the relevant publications which have influenced thinking around this important topic. The debate around the EMRP has been shaped by which of two approaches has been taken to assess it, ex-post analysis through examination of historical data or ex-ante expectations through surveys or predictive models such as the Dividend Discount Model (DDM).

Historically, most academic research focused on the estimation of the EMRP through ex-post analysis of equity market returns. The first significant publication on the subject of the EMRP was **Mehra and Prescott (1985),** the authors identified a major discrepancy between theory and evidence through empirical analysis, which has been identified as the "EMRP puzzle". In their article, the authors concluded that the US EMRP should be very low in order to be in line with the output of models based on standard economic theory. In contrast, the equity market returns that had observed in relation to risk-free investments had been relatively high.

There has been some research on the appropriateness of using historical (i.e. ex-post) EMRP values for expected returns in the future, for example **Brown, Goetzmann & Ross (1995)** suggest that survivorship bias may lead to overstatement of the EMRP. Further statistical problems arising from historic returns were identified by **Clinebell et al (1994)** where the authors tested US equity returns from 1926 and found significant autocorrelation. However, **Bali and Guirguis (2004)** cautioned against accepting theses results, finding that while market returns are not always anomalous, Clinebell et al's conclusion was influenced by results from one year in their study. The sensitivity of statistical tests to the sample period was emphasised by **Ibbotson associates (2006)** as a reason for caution when using historical estimates for the EMRP. The author advises taking the longest sample period possible to smooth sub-sample variations in the EMRP.

There have been several attempts to solve the "puzzle" and reconcile theory with observed market returns. **Dimson, Marsh and Staunton (2006**) (DMS) suggest that the puzzle is about the magnitude of the EMRP. The authors propose two logical solutions to the puzzle, either that standard economic models are wrong, or that the historic observed returns are misleading (and a lower EMRP should be expected in the future).

The authors observe that since the initial publication of the "puzzle" there have been several attempts to update models to achieve a closer theoretical fit with historical returns. In some circumstances models have been produced which are broadly consistent with observed returns, but even in these newer models, the EMRP still requires much larger than expected aversion to risk to fit with theory. The authors suggest that the identified problems could come from non-stationarity of the EMRP or the limitations of research to the US equity market due to a lack of foreign long-run data.

The authors disagree with the idea of a biased EMRP (as suggested by Brown Goetzmann and Ross), but are sympathetic to the view that using the historic EMRP may be a poor option. The authors suggest that due to the large standard error of historical data and the likelihood that premiums are non stationary, using historical data to predict the EMRP is most likely a flawed approach.

Nonetheless, the authors attempt to minimise these potential problems by expanding their research to 17 equity markets to diversify away from any problems specific to studies of the US equity market. Decomposing the EMRP into component parts (dividend yield, payout ratio growth rate and risk free rate) the article concludes that an EMRP (calculated on a geometric basis over bills) of 3-3.5% is appropriate, and that the majority of textbook and academic approaches based on higher historic values are unrealistic.

DMS also recognise that the large standard errors of historical returns make it difficult to develop a robust forward looking expected premium in general.

An alternative approach, taken by **Fernandez (2006**) was to examine the specification of the EMRP. The author suggests it is not one, but four different concepts: the Historical (HEP), Required (REP), Expected (EEP) or Implied (IEP) equity premium. Apart from the HEP, each of these will vary according to the end investor; for example a universal IEP would require homogenous expectations between market participants about future growth rates.

The author concludes that overall, the most important measure is the EEP, as that is what guides investors' choices, but that the "puzzle" can be solved if it is accepted that using a single EMRP is an inappropriate approach to the problem. This is also consistent with evidence reported by **Derrig & Orr (2004)**, who surveyed approaches to estimating the EMRP, in particular highlighting the dispersal of estimates driven by the relevant definition of the EMRP.

However, a number of academics and practitioners alike continue to use the historical EMRP as a best estimate for the future. For example, **Derrig & Orr (2004)** also undertake time series examination of the Ibbotson 1926-2002 dataset, and find evidence that the EMRP is mean reverting, hence concluding that the best forward estimate is the historic realised mean. Similarly, **Mehra and Prescott (2003)** state that over long time periods the equity premium is expected to remain fairly stable, whereas **Welch and Goyal (2008)** could not identify any robust enough predictive variables to be used for forecasting the equity premium and therefore propose that an historic equity premium should be used as the least unreliable method for any forecasting purposes. Their analysis focused on identifying models on annual or shorter frequency that systematically had both good in-sample and out-of sample performance – however, they were unable to find any model with strong predictive power for stock returns and/or equity premia, and instead found that these models were unstable and had predicted poorly both in-sample and out-of sample over the last several years. In conclusion, they question the widely held belief underlying the ability of certain variables/models to predict stock market returns and the reliance of investors in using such variables when making investment decisions. Nonetheless, considering the identified limitations of historical data and that the EMRP is essentially a forward looking concept, many academics still build their forecasts on forward looking surveys (i.e. ex-ante analysis).

Consistent with **Welch and Goyal (2008)**, **Rapach, Strauss and Zhou (2010)** find evidence that various economic models for estimating the EMRP with strong in-sample predictive ability tend to perform poorly when forecasting stock returns relative to historical averages. However, in contrast to Welch and Goyal, the authors suggest that combining individual forecast might be a better alternative than focusing on historical averages – finding evidence that combination forecasts outperform historical averages by statistically significant and economically meaningful margins on a reasonably consistent basis overtime. They argue that the individual forecasts might be impaired due to model uncertainty and instability, nonetheless the usefulness of forecasting combining methods stems from highly uncertain, complex and constantly evolving data generating process underlying expected equity returns – which are related to a similar process in the real economy.

Among the recent studies focusing on ex-ante approaches to estimate the EMRP, are those carried out by **Graham and Harvey (2010)** and researchers at the **Duke University Fuqua Business School**, both in the US. The quarterly survey of US CFOs identified an increase in the estimated EMRP during the heights of the 2008 financial crisis. The authors find that the EMRP is positively correlated with market volatility and credit spreads.

Using a similar process, **Fernandez & Del Campo (2010)** use a larger-scale survey to identify the market risk premium, which represents the minimum return from the equity market which analysts, companies and academics expect. The survey returns a high dispersion of risk premium estimates, corresponding with what Derrig & Orr (2004) and others suggested; that estimates of EMRP are sensitive to its specification and intended purpose, as the three sub-groups each have different market return requirements.

A further approach to the market risk premium is through taking observations of market trends and characteristics, like the trend dividend growth rate, to calculate an implied EMRP value through models such as the Dividend Discount Model (DDM). This is of particular relevance during times when market conditions have diverged from "normal" l crisis, as the long-term historic EMRP will no longer necessarily be an appropriate measure.

Professor **Damodaran** calculates a forward looking (ex-ante) estimate of the EMRP (implied) for the S&P 500 index by projecting the expected distributions (dividends and stock buy-backs) for individual firms included within the S&P 500 index using average analyst estimates for earnings growth for the first 5 years and assuming that growth will subsequently equal the risk-free rate. He then solves for the expected return that equates the current level of the S&P 500 index to the expected distribution. The EMRP is estimated by subtracting from the expected return on the S&P 500 the current yield on 10-year U.S. government bonds. His most recent estimate, in December 2010, converted to an arithmetic average suggests an EMRP of approximately 5.30%.

Fama and French (2002) also estimated the EMRP using dividend and earnings growth model and benchmarked the estimates to the equity market risk premium based on realised average stock returns. They find that the EMRP based on dividend and earnings growth model, 2.55% and 4.32% respectively, were much lower than the EMRP estimate of 7.43% based on average stock returns between 1951-2000. Their analysis, thus suggests that average stock returns (i.e. ex-post) between 1951-2000 exceeded the expected returns (ex-ante), implying unexpected capital gains for shareholders. They further suggest that such unexpected capital gains can plausibly be explained by low expected future returns – potentially caused by a number of different factors such as wider equity market participation, lower cost of diversification of equity portfolios and variation in response to macro-economic factors.

Jackel & Muhlhauser (2011) use four alternative implied approaches built around the DDM model to estimate the market implied cost of capital, (a proxy for the EMRP) to estimate the EMRP for a selection of EU countries since 1994. The authors find that the implied EMRP is 4.4-6.9%, higher than previous studies in this area such as **Claus & Thomas (2001)**. The authors suggest that their study supports previous arguments that implied approaches to the EMRP are more appropriate than using historical returns as they exhibit significantly lower volatility in risk premium estimates. The authors also suggest their approach is more appropriate as it allows current market expectations of future returns to be reflected more quickly and more appropriately in economic models. **Grabowski (2011)** reviews the developments of the risk-free rate and the EMRP through the financial crisis and finds support for short-term adjustments to economic calculations to account for market conditions. The author emphasises the importance of distinguishing between the conditional and unconditional EMRP. The author states that while historical EMRP estimates are *unconditional* over a specified time, the EMRP is not always a static measure, but can be dynamic through the business cycle (known as the *conditional* EMRP) depending on economic conditions at the time.

This is consistent with evidence across various academic studies, which indeed suggest that the EMRP varies over the business cycle; it is lowest in periods of business expansion and greatest in periods of recession. Indeed **Lettau, Ludvugson and Wachter (2007)** find that there is a strong correlation between low-frequency movements in macroeconomic volatility (i.e. reflecting periods of business expansion) and asset prices – particularly in the post-war data. They suggest that the increase in asset values towards the end of the 20th century can be plausibly described as a rational response to strong performance across various macro-economic factors, as declining underlying macro-economic risk led to a fall in expected future stock returns and the EMRP. Similarly, periods of high macro-economic volatility are likely to depress asset prices as expected stock returns and the EMRP will increase.

Moreover, the EMRP appears to be positively correlated with long-term bond prices (increasing as bond values increase) and with the default premium (increasing as the differential between higher and lower rated bond yields increases).

However, the author suggests that for valuation of businesses and investments purposes, the *conditional* ERP will generally be of less importance over time, and during periods of financial stability (i.e. once the worst of the crisis is behind us) the long-term *unconditional* EMRP represents his preferred approach. Nonetheless, the author suggests that the conditional EMRP can be estimated based on forward looking approaches (ex-ante) and argues that when the risk-free rate is extremely low it is best to normalise it to smooth out temporary market moves. Even when a "normalised" risk-free rate is used, the author finds that current forward looking estimates of EMRP to be at the top end of historical ranges.

It is important to bear in mind that movements in the risk-free rate and EMRP need to be considered in relation to the returns to equity. While the two former variables have been observed to fluctuate over time (when the EMRP is considered to be conditional), in general, studies have shown that returns to equity have remained relatively stable.

Smithers (2003) proposed that it was difficult to assess the historic behaviour of the risk free rate and equity risk premium, and hence expected returns to equity should not be estimated from its component parts, but as a whole. This idea was supported by long-run analysis of real equity returns which were seen to be more stable across time and countries than its component parts. This view has gained credence during the financial crisis and a number of commentators have found that the underlying volatility in both the risk-free rate and EMRP means that it is easier to focus on the cost of equity directly.

McKinsey (2008) also concludes that the cost of equity remain fairly stable over both steady and more volatile market conditions. The authors take a market based approach and use a discounted cash flow model to estimate changes in the cost of equity from changes in earnings and equity prices, their mid-point estimate allows for a ½% increase in cost of equity finance, which the authors conclude is within usual annual fluctuations.

The conclusion that should be drawn from this review of literature, and also those of the previous 2003 and 2007 reports, is that there is no strong consensus view as to what the universally appropriate EMRP should be, given its underlying sensitivity to estimation methodologies. Arguments have been made in favour of historical based approaches and also forward expectations based approaches, thus in order to obtain the most robust forward looking EMRP estimate possible for our purposes, we suggest that both ex-post and ex-ante methods should be applied and that the ex-post analysis extended over the longest and broadest possible reliable timescale, this aspect is reflected in our methodology.

The difference between our 2007 report and this report is that we are very careful in how we interpret and combine different source of evidence. It is clear that dated studies have less relevance. Further, there is a clear risk of inconsistencies in combining historical studies of equity risk premia with current figures for the risk-free rate.

Appendix D. - Dividend Discount Model

Use of the Dividend Discount Model to assess the equity market risk premium

One of the most widely used and recognised forward-looking methods to assess equity markets is the dividend discount model (DDM), which is based on the view that the current share price should equal the discounted present value of expected future dividends. Assuming constant dividend growth, the DDM implies that an 'equilibrium' dividend yield can be estimated as:

$$D/P = r + e - g$$

Where: g = expected nominal dividend growth rate, r = nominal risk free interest rate, e = equity risk premium, D/P = prospective dividend yield.

A key feature of the DDM is that it allows derivation of implied EMRP by inputting alternative plausible assumptions on the key variables (g and r) of the model in order to produce estimates for the implied EMRP. Essentially, the EMRP is not directly observable, and so calculating implied EMRP requires assumptions to be made over the value for dividend yield, expected dividend growth and risk free rate which are consistent with actual market valuations at the end of Q3 2011. This leaves the EMRP unknown, which is then derived such that it is consistent with the actual market value on the valuation date. This implied value can then be compared with its historic/benchmark average.

Specifically, these implied values were calculated using the assumptions outlined in Table A3 below. We used 15 year government bond yields in each country to estimate the nominal risk free rate. We used independent forecasts of real GDP growth for the period 2011-2016 adjusted by independent forecasts[110] for inflation in each country to estimate future nominal GDP growth and used it as a proxy for nominal dividend growth (on the assumption that these should be broadly equal in the long-term). Also, we used current dividend yield for the S&P500 and the FTSE ALL Share as proxies for prospective dividend yields.

Table A3: Inputs to the DDM calculation

Input	US	UK
Dividend yield (D/P)	2.28%	3.67%
Growth rate (nominal, g)	4.06%	4.60%
Risk free rate (nominal, r)	2.90%	2.94%

Source: Datastream, IMF, "World Economic Outlook", 2011 and PwC analysis

Note: The nominal risk-free rate is slightly below our recommended range of 3% to 3½% as it represents the spot estimate on 15 year maturity nominal gilts and we expect reversion to more 'normal' yields in the future.

The market implied EMRP values for the US and UK are presented in Table A4 below, along with the previous 2007 estimates for comparison.

The effects of the financial crisis and current strained market conditions can be seen in the elevated conditional EMRP values. It should also be noted that the forecast growth rates we have used incorporate expectations for low economic and dividend growth for the next five years, influenced by current market conditions. Over the entire 10-15 year time period which this report addresses we would expect the inputs to the DDM, and the resulting EMRP estimate, to more closely reflect their trend levels.

[110] IMF World Economic Outlook, September 2011

Table A4: Breakeven DDM estimated EMRP for US and UK

Country	2007 DDM implied EMRP (%)	2011 DDM implied EMRP (%)
US	3.1%	3.4%
UK	3.0%	5.3%

Source: Datastream, IMF, "World Economic Outlook", 2011 and PwC analysis

Note: For the 2011 implied EMRP estimate, we use the current dividend yield from the S&P500 and FTSE ALL Share as a proxy for prospective dividend yield. Also, this approach slightly differs from our 2007 report, where we estimated the dividend yield as the product of dividend payout ratio and the price earnings ratio, when estimating the implied EMRP.

Appendix E. - Property beta analysis

In this appendix we set out the equity and asset betas of some UK property companies to demonstrate the risk of property investment, relative to equity investment.

Under the CAPM framework[111], developed by Sharpe and Litner in the 1960s, the beta (β) represents the risk of a firm relative to the market portfolio. As such, the beta only captures the systematic risk inherent in an equity investment as the model assumes that investors can 'diversify' idiosyncratic (or unsystematic) risk through holding a diversified portfolio of stocks – thus investors are only compensated for risk that are correlated with market and therefore are not diversifiable. A stock with a high beta will require a higher return than an asset with a low beta as exposure to non-diversifiable (or systematic risk) would be higher.

Mathematically, β is calculated as:

$$\beta_i = \frac{\mathrm{cov}(r_i, r_m)}{\sigma_m^2}$$

where β_i is the beta coefficient for stock i, $\mathrm{Cov}(r_i, r_m)$ represents the covariance between returns on stock i and the market portfolio and σ_m^2 is the variance of the rate of return of the market portfolio. The higher the covariance shared between the stock and the market, the higher β_i, while the higher the volatility of the market, the lower the β_i. More generally the above formula is the standard formula for the coefficient from an ordinary least squares regression, and hence the beta coefficient can be calculated using OLS estimation.

Equity betas are calculated from the market movement in share prices of individual stocks compared to broader market indices. In essence they encapsulate both financial as well as business (operational) risk for the firm; hence they are impacted by the financing structure adopted by the firm. To estimate the underlying business risk, independent of the financing structure, asset betas are generally used. They are calculated from the equity beta by adjusting it for gearing or leveraging of the company and therefore account for the inherent systematic riskiness of a company's operations. The average equity beta (for the market portfolio) is by definition 1, assuming an average gearing of around 30% implies an average asset beta of around 0.7[112].

The table below presents the asset betas for a range of property owning UK companies. Some of the companies also engage in property development, which is considered to be a more risky activity, and would carry a higher asset beta as a result. The table shows that property-owning companies have predominantly lower asset betas than for the equity market as a whole (assuming a conservative gearing assumption) and supports our assumption that expected property returns should be lower than equity returns.

[111] For a fuller explanation of the Capital Asset Pricing Model and beta, see: Ogier T, Rugman J and Spicer L, 2004 "The real cost of capital, a business field guide to better financial decisions", FT Prentice Hall.

[112] The formula for unlevering is often referred to as the Harris Pringle unlevering formula: $\beta_e = \beta_a\left(1+\frac{D}{E}\right)$ where D is the value of debt and E the value of equity.

Table A5 Historic asset betas for a selection of UK property companies

Company	5 year asset beta	10 year asset beta
Quintain Estates & Dev Plc	0.32	0.21
St Modwen Properties Plc	0.59	0.48
Daejan Holdings Plc	0.47	0.47
Grainger Plc	0.40	0.32
Capital Regional Plc	0.81	0.59
Unite Group Plc	0.65	0.54
Helical Bar Plc	0.42	0.48
CLS Holdings	0.28	0.25
Mountview Estates	0.69	0.64
Average values:	0.51	0.44

Source: Capital IQ, PwC calculations

Appendix F. - Debt beta analysis

One method of calculating the expected return on corporate debt is measuring the yields of corporate bonds over the risk-free rate and making a deduction for expected default losses. An alternative approach is through the CAPM framework using estimates for debt betas and the EMRP, given by the equation below:

$$kd = R_f + \beta_D(EMRP)$$

Recent estimates (academic and commercial) of debt betas are summarised in Table A6 below.

Table A6 Estimates of debt betas

Who	Debt beta estimate	Approach for estimating the debt beta
A		
Brealey & Myers (2003)	0.17	Regressed Salomon Brothers' high grade long-term corporate bond index (maturity > 20 years) regressed against the S&P 500. Using this method the beta of the bond portfolio in the ten years ending December 2000 was 0.17
R		, so common place assumption is made that the beta of debt is zero (p. 329)
Cornell & Green (1991)	0.25	For "high-grade bonds" using monthly data for the period 01/977 to 12/1989 they calculate a debt beta of 0.25 by regressing a portfolio of bonds rated BBB or above against the S&P 500 index.
Weinstein (1987)	0.006 – 0.007	Regressions of investment grade / non-investment grade bonds from 1962-1974
R		
Ofcom – New Pricing Framework for Open reach (2008)	0.10-0.15	Take their lead as the 0.1 figure used by the Competition Commission, but adjust up to 0.15 to account for debt margins at BT Group
Civil Aviation Authority – Heathrow and Gatwick (2008)	0.10	Based on the decomposition of debt premium, in-line with an approach proposed by Europe Economics. CAA identified a range of 0.10 – 0.19, but recommended a cautious assumption of 0.10
Competition commission (2008)	0.10 – 0.22	Decomposition method = (debt premium – liquidity premium – default premium) * EMRP / 100
Competition commission (2007)	0.09 – 0.19	Decomposition method = (debt premium – liquidity premium – default premium) * EMRP / 100 First inquiry that looked into debt betas, so used a cautious estimate of 0.1
Queensland Competition Authority (2004/05)	0.1	Assumes 0.1, which is a midpoint of range of 0.0 to 0.2, which was the suggested range from an open consultation

Source: Brealey & Myers (2003) Principles of corporate finance 7th edition; Ross & Westerfield (2005) Corporate finance; Cornell & Green (1991) The investment performance of low-grade bond funds; Weinstein (1987) A curmudgeon's view of junk bonds, CAA (2008) Economic regulation of Heathrow and Gatwick 2008-2013, Competition Commission (2008) Stansted Airport – Q5 price control review, Competition Commission (2007) Heathrow and Gatwick – Q5 price control review, Queensland Competition Authority (2004/05) Annual Report 2004-05

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Comments of the Peer Reviewers

Comments on the PWC Report to the FSA on rates of return

Professor Ray Barrell Brunel University

5th April 2012

Introduction

Forecasting rates of return on bonds and equities for the next five to fifteen years is probably more difficult at present than at any time since 1992, except perhaps during the first nine months after the financial crisis in the autumn of 2008. The PWC report discusses these difficulties well, and draws reasonable conclusions. The uncertainty faced by investors concerns both the macro economic environment and the rates of return they might receive, and my comments discuss both, as does the report.

The longer term outlook

The impact of the crisis on output in the UK, and hence on earnings and rates of return is difficult to assess, and in particular it is hard to assess the scale of the movement down in the growth path of the economy. In the longer term the level of output depends on labour and capital inputs and on the level of technical progress and efficiency, whilst the (per capita) growth rate depends upon the rate of growth of technical progress. There is little reason to think that the economic crisis will impact on the rate of technical progress.

The scar in output per person hour induced by the crisis is difficult to judge, but is central to any longer term projections. The most likely effects are those on the equilibrium capital labour ratio and on the skills of the workforce. Long periods of unemployment probably reduce the skills of the workforce for a sustained period. The rise in unemployment may reduce sustainable output by around one percent because of this scar, but this is much less important than the impacts of the change in perceived risk and its negative impact on the desired stock of capital. Although there remains a significant output gap, perhaps 4 per cent of the fall in output seen during the recession may be permanent. We should as a result see slow productivity and real wage growth for some years. The projections of output growth and real wage growth over the medium term in the PWC report have taken these factors into account, but there remains significant uncertainty behind any projections in this area.

Forecasting inflation is difficult, but the best projection would be to assume that the Bank of England tries to hit 2 per cent year, and that in future it succeeds in doing so. It will not try to compensate for the recent overshoot, and hence it is unlikely that inflation will be below 2 per cent for long in the near future. It is very difficult to judge expected inflation from the difference in yields on indexed and unindexed stocks. This is in part because indexed stocks depend on the RPI w I. If a holder of the stock has CPI based commitments (as the average consumer does) then there is a tax advantage in holding indexed stocks. The PWC report uses the GDP deflator, which grows less rapidly that the RPI, as the price inflation measure to evaluate real returns on indexed government bonds, and this is a useful compromise.

Rates of Return

In general it appears that the risk free rate of return that might be available over the next decade or so has fallen, whilst the Risk Premium associated with equity investment has risen. When there is a flight from risk there is probably a flight to quality, and it is possible that an aversion to Greek, Portuguese, Irish, Spanish and Italian government debt has been matched by an increased desire for UK, German and perhaps US government debt. This makes the interpretation of future risk free returns difficult, as the relative risk perceptions are likely to change as (and if) the Euro Area moves to a sounder fiscal basis. As the report emphasises, both QE and relative volatilities may also have opened a wedge between real returns on indexed and unindexed bonds, and again this may shrink as the economy stabilises.

The environment going forward must be seen as more uncertain than it was in 2007, and rates of return are likely to be lower. Both of these features are reflected in the summary tables in the report, with lower overall rates of return and larger uncertainty bounds for all classes of assets than we saw in 2007. It is imperative that consumers should be clear that they may be facing a period of low risk free returns over the next decade or more.

Conclusions

My feeling is that the report is a balanced view of returns, and emphasises the need for wider bands of uncertainty in general as we have experienced such turbulence. Investors also need to be warned on downside risks. The projections of earnings growth in the longer term are perhaps a little high given expected changes in productivity growth. Perhaps the projections of RPI inflation are also too high, in part I suspect because housing markets are likely to be weaker than projected here.

Given what has happened to government debt ratings (a) in Europe we perhaps should be aware that there is no really risk free assets, and also bear in mind that the last OECD government to default (in 1948) was Germany. Things can change, and the myth of the Great Moderation is one of them, and this should affect changes in risk perceptions (and return bounds) as compared to 2007.

Comments of Professor Malcolm Brown (University of Kent) – 3rd April 2012

Review of FSA Projection Rates

I have been asked by the Financial Services Authority (FSA) to carry out an independent review of research undertaken by PricewaterhouseCoopers (PwC) on behalf of the FSA. This research (which is summarised in their report) is into the FSA rates of return assumptions for the calculation of prospective future benefits for retail financial services products. In particular, I was asked to address the following:

- Is the methodology adopted suitable?
- Are the data sources and research accessed reliable and appropriate?
- Is the analysis of the data relevant and appropriate?
- Are the conclusions fair and the opinions reached reasonable given the methodology adopted, data accessed and the analysis undertaken?

The scope of the report (which is defined on page 9 and is consistent with the terms of reference shown on page 68) is broadly similar to that in the previous PwC report (2007). However, this report has been prepared at a time when the economic and market environment is significantly different to that during 2007. Currently, most commentators expect the UK economy will slowly return to trend growth and more normalised interest rates, so PwC have formed a short term outlook for the economy and financial markets, as well as taking a longer term view, in order to present assumptions for the medium term. This, in my opinion, is a sensible approach to take.

I have commented on earlier drafts of the report and I am satisfied that my comments and suggestions have been addressed in the final version. It brings together the relevant information and data that is appropriate to set assumptions regarding future investment returns, future inflation and the typical asset mix of retail investment products. This then leads to a fixed intermediate rate of return assumption which can be applied to investment illustrations of all durations. There is also an estimation given for the difference in returns between taxed and tax-advantaged products. My overall assessment is that the methodology is suitable and the data sources/ research accessed are reliable and appropriate. The conclusions are fair and the opinions reached are reasonable. In Section 7 of the report, PwC provide their response to three specific questions asked by the FSA. In my opinion, their answers to these questions are sound and consistent with their findings summarised in earlier sections of the report.

Producing a fixed intermediate rate of return assumption for all durations of investment, particularly at a time when interest rates are historically low but are expected to slowly return to more normalised rates, is a significant challenge. PwC have focused on an investment period of around 10-15 years, to reflect the typical duration of investment illustrations by retail financial services firms. In reality, illustrations are applied to short, medium, and long term investments and producing assumed rate of returns that are dependent on the duration of the investment would help overcome the challenge of producing a single intermediate rate. This issue is recognised in the introduction to Section 5 of the report and is something the FSA may wish to consider in the future.

Malcolm Brown FIA FIMA

Brown

Comments of Professor Mark Freeman (Loughborough University)

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3 April 2012

Review of FSA Projection Rates; March 2012

I have been asked by the Financial Services Authority (FSA) to undertake an independent review of the commissioned report "Review of FSA Projection Rates; March 2012" written by PricewaterhouseCoopers. Specifically, I have been requested to respond to the following:

- Is the methodology adopted suitable?
- Are the data sources and research accessed reliable and appropriate?
- Is the analysis of the data relevant and appropriate?
- Are the conclusions fair and the opinions reached reasonable given the methodology adopted, data accessed and analysis undertaken?

My overall view is that the report performs strongly against all four of these questions. The authors have used up-to-date data and well-understood methods. The use of practitioner-based resources is appropriate and there is broad reference to the academic literature. The analysis is thorough. Based on the data accessed, methods used and analysis undertaken, the conclusions are fair and the opinions reached reasonable.

I have provided two sets of detailed responses to previous versions of this report and am satisfied that many of my observations have been addressed in subsequent revisions. The rest of this letter, therefore, briefly provides more general comments on some broad issues covered by this review.

The report has been commissioned to provide an "appropriate single rate for illustrating potential returns" (p.70). Throughout the report the authors have explicitly interpreted this appropriate single rate as being a median estimate (p.10); a decision supported by the academic literature.[1] It is important, though, that readers of this report understand the implications of this choice. In particular, it does not correspond to either the most likely single outcome, which is characterised by the mode of the distribution, or the mathematical expectation of the future return (the mean). For heavily right-skewed distributions, such as those used to characterise future equity returns, the modal return is substantially below the median return, which in turn is substantially below the mean.

The concentration on a single projected rate means that the authors have not been commissioned to comment on the distribution of potential future returns. This therefore excludes from the report a detailed quantitative assessment of future market volatility or tail risk (the potential f t, but low probability, events). The authors have based their estimates around the central view that the economy will return to sustained real growth at a level slightly below the pre-crisis average (p.4). This position is strongly defended in the report. However, as is explicitly noted "it could be argued that risks for these forecasts are to the downside, at least in the short-term given in particular the chance of severe downside scenarios for the outcome of the Eurozone crisis that cannot easily be taken into account in standard economic forecasts models" (p.15). This is a caveat that I think the reader should consider carefully as the broad macro-economic position taken by the authors significantly influences the financial forecasts contained within the report.

One area where this overall f t of stability most clearly impacts upon projection rates is in relation to nominal government bond returns. The report combines a projection of real Treasury bond returns of 0.5%-1.0% (Table 1) with the view that the Monetary Policy Committee will reduce inflation from its recent high levels back to rates that are consistent with the current Bank of England target

[1] Hughson, E., M. Stutzer and C. Yung (2006), "The Misuse of Expected Returns", Financial Analysts Journal, 62(6), 88-96.

(Table 3.5). This captures the belief that UK Treasury bonds are likely to remain a relatively safe haven over the medium term and that inflation will remain under domestic policy makers' control. While, again, the authors provide good support f these views, the significant uncertainties are more likely to lie on the bearish side of this argument than the bullish. For example, the UK currently lies under the potential threat of losing its AAA rating on Treasury bonds.[2] While any downgrade will not necessarily lead to a rise in yields, as we have seen from the US, this remains a significant possibility. If there should be a loss of safe haven status then this could result in rapid rises in nominal bond yields caused by increases in both the real cost of government borrowing and in inflation resulting from a lack of confidence in sterling. Such a situation has recently been seen in Italy, for example, where even within a single currency 10-year Treasury yields rose from 3.8% in October 2010 to 7.3% in November 2011. Of course, as the cost of government debt rises so Treasury prices fall, meaning that any significant long-term increase in yields in the Gilts market will lead to lower realised fixed-income returns than are predicted in this report.

Similarly, the rise in the equity market risk premium (EMRP) from 3%-4% in 2007 to 3.5%-4.5% in the current report (Table 1) is highly dependent on the stable medium-term view of the macro-economy that underlies the analysis presented here. The stock market is likely to have been held back over the past five years (Figure 5.9) by a combination of two effects; a decline in predicted future cash flows and an increase in the risk premium caused by rising macro-economic uncertainty.[3] Should the global economic and banking situations become calmer then these effects might well be reversed. This, in turn, would lead to strong equity returns in comparison to Treasury bond yields over the investment horizons considered here. This point is clearly articulated in section 5.2. Similarly the authors' prediction of declining risk premia, caused by the outlook for more stable economic conditions, is seen in relation to corporate bond returns. The combined risk / liquidity premia on these bonds is forecast to lie in the range 1%-2% over Treasury returns (Table 1). While this spread is slightly higher than the range of 0.75%-1% quoted in the 2007 report, it remains significantly below the average over the credit crisis period (Figure 5.13).

Therefore the authors present strong arguments in support of their central f -term macro-economic stability. The financial projections, which are median estimates, are universally consistent with this overall outlook. However, as the authors themselves acknowledge, the significant uncertainties appear to be more on the downside than the upside. This means that readers of the report should be aware that there is a material possibility that realised returns may be significantly below the single projection rates presented here.[4]

Since the initial report was written in 2003, there have been material changes in the average holdings of pension funds (Figure 4.1). In particular, UK equities now account for just over one quintile of total pension fund investment, substantially lower than the almost 30% currently held in overseas equities. This means that, when considering overall future returns on equity portfolios, currency movements will have an important effect. The report briefly covers this issue (p.19) but primarily in the context of inflation forecasting. While I agree that "making precise predictions for exchange rates is very difficult" (p.19) this does not mean it is impossible in a report providing median estimates. For example, while the academic literature highlights the difficulty of making accurate foreign exchange forecasts, the available evidence points towards there being some economically significant predictability at the investment horizons considered by this report.[5] Indeed, the NiGEM model quoted by the report suggests likely future sterling appreciation, but this is then not explicitly considered when assessing future sterling-denominated asset returns. This is an area that future reports might wish to consider more fully.

Mark C. Freeman.

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[2] http://ww .bbc.co.uk/news/business-17375585

[3] Lettau, M., S.C. Ludvigson, and J.A. Wachter, (2008), "The declining equity premium: What role does macroeconomic risk play?", Review of Financial Studies, 21, 1653–1687 explain how a decline in macro-economic risk in the 1990s helped cause the bull market of that decade.

[4] Of course it is also true that the economy may recover faster and harder than the authors envisage, giving the potential for realised returns significantly greater than these median projection rates. The statistical point here is that the 90% confidence interval and the level of tail risk are both likely to be materially higher than at the times when the 2003 and 2007 reports were written. While a detailed analysis of these uncertainties lies outside the terms of reference for this report, investors interested in downside risk should be made aware of these issues.

[5] See, for example, Sarno, L. (2005) "Viewpoint: Towards a solution to the puzzles in exchange rate economics: where do we stand?", Canadian Journal of Economics, 38, 673-708.

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