

Agenda

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Time and timing in capital markets: implications for pensions investment

Capital market downturns can cause concern regarding deterioration of defined-contribution pension scheme savings. Looking at historical equity and government bond returns, how does long-run investment differ from short-run investment, and what are the implications for pensions investment? What is the impact of market fluctuations and downturns on pensions savings?

The current financial crisis and economic downturn have led to a significant fall in stock market values worldwide. For example, in the one-year period ending October 22nd 2008, indices such as the UK FTSE 100, the French CAC 40 and the German DAX had fallen by around 40% or more.¹ Not surprisingly, many people are concerned about the effect that this could have on their retirement income, particularly where their pensions no longer guarantee a certain benefit on retirement but are of defined-contribution (DC) form.² In DC schemes, individuals' retirement wealth depends on the performance of their investments in capital markets, and is therefore directly affected by periods of market downturn.

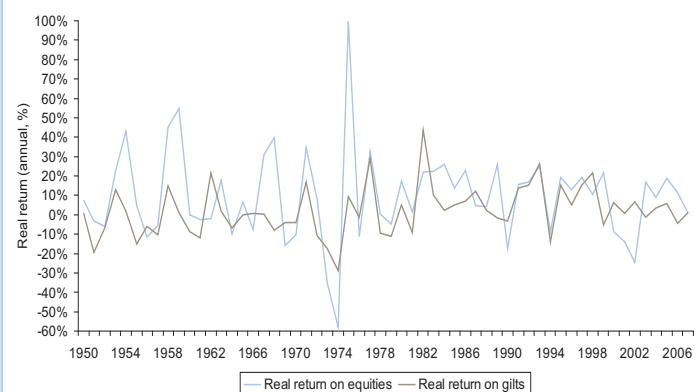
The risk of market downturns and their effects on financial market returns may therefore prompt many to invest their DC pensions savings in assets that are perceived as relatively 'safe', such as government bonds or products with some sort of guarantee or capital protection, rather than in equities.

This article examines whether those saving for their pensions may have cause for concern during times of market downturn. Given that, at their core, DC pension schemes are vehicles for long-term savings and investment, it shows how the risk–return profile of long-run investment differs from that of short-run investment. Simulations are presented to illustrate the impact of different investment strategies on pension investment, including the impact of market fluctuations and downturns.

Long-run investment is different from short-run investment

While the current crisis reflects a scale not seen before, financial market downturns are hardly a new

Figure 1 Real annual returns on UK equities and gilts, 1950–2007



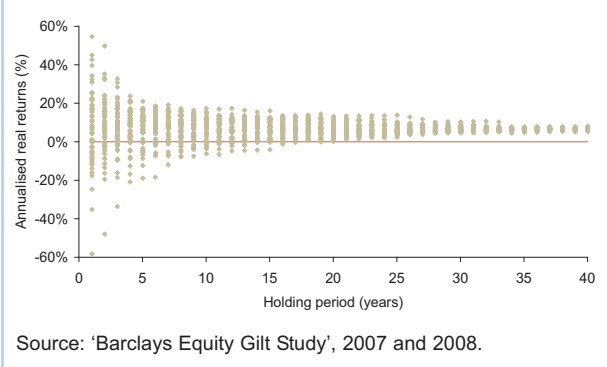
Source: 'Barclays Equity Gilt Study', 2007 and 2008.

phenomenon. As an example, Figure 1 shows the annual UK equities and gilts (government bonds) returns over the period 1950 to 2007. During this period, equities experienced significant ups and downs, with particularly sharp declines in 1973/74—the return on UK equities was –58% in real terms in 1974.

Taking the average over the entire period, real returns on equities were around 7%, compared with a 1.24% real return on gilts.³ At the same time, however, equities have shown significantly greater volatility—the standard deviation of annual real equity returns was 23.3%, nearly twice the standard deviation of real returns on gilts (12.75%).⁴

Even though equities exhibit high annual return volatility, the picture changes significantly if investments over longer time periods are considered. Figure 2 illustrates annualised real returns on UK equities for investment holding periods of up to 40 years, based on annual returns data from 1950 to 2007.⁵ It shows that, as the

Figure 2 Annualised real equity returns as a function of the holding period, 1950–2007



holding period increases, the dispersion of annualised returns is reduced significantly. For example, for a 20-year holding period, all annualised (average) return observations are within the range 0.3–13.3%, and the standard deviation is only 3.4%. This means that, at any time between 1950 and 2007, a buy-and-hold-for-20-years investment in the UK equity index would have yielded positive annual returns on average (and overall). Thus, for longer holding periods, the risk surrounding returns on equity investment is reduced significantly compared with shorter holding periods.

The corresponding results for government bonds (not shown here) also show that the dispersion of annualised real returns decreases with the holding period. However, unlike the case for equity, some return observations remain negative, even for holding periods for as long as 40 years.

Clearly, these results need to be interpreted in the correct context and are subject to a number of qualifications. In particular, they are based on historical returns data that may not be representative of the future; the returns apply to indices of equities and bonds rather than individual securities; the bonds are not index-linked; and the annual returns data does not take account of the fact that risk is reduced if the bonds are held to maturity.

Nonetheless, and consistent with findings in the academic literature, the results show that the risk–return profile changes significantly with the length of the investment horizon and that, over the long run, equity returns have historically not only been higher than bond returns on average, but also less volatile.

What are the implications for pensions investment?

DC pensions are, in essence, vehicles for long-term savings and investment, and it is therefore the risk–return profile over longer time horizons that is more relevant for pensions investment.

To illustrate the effect of different investment strategies and investment horizons on pension wealth accumulation, Oxera has undertaken simulations, based on the following assumptions.⁶

- An individual contributes to a DC pension scheme on an annual basis such that the contribution in the first year is £1,000, and contributions then grow at 2% per annum in real terms.
- The contributions are invested either in gilts (government bonds) or equity, with investment returns behaving in line with historical parameters (ie, means, standard deviations, covariance) obtained from historical UK annual returns data (see above and note to Table 1).
- Different time horizons for pension accumulation are considered, with a maximum horizon of 30 years (eg, the individual starts to contribute to a scheme at the age of 35 and retires at the age of 65).
- It is assumed that there is no management fee, and the returns are assumed to be exempt from tax.

The model is based on a simulation of real bond and equity returns to obtain a distribution of accumulated pension wealth under the bonds or equity investment strategy.

Table 1 summarises the results of the simulations for one year, five-year and 30-year time horizons for pension accumulation. For each of the equity and bond investment strategies, it shows the median accumulated wealth in the individual DC account, as well as the probability of obtaining less than the total contributions at the end of the accumulation period.

Based on the simulations using historical return parameters, the median wealth after one year's investment is £1,069 for equity and £1,012 for gilts, and the probability of the accumulated wealth being below the total contribution of £1,000 is 38% for equity and 46% for gilts. The results for the 30-year investment horizon show that the median wealth for equities of £132,253 is significantly above the total contributions made over the period (£38,407) and the median wealth from investment in gilts (£50,048). Moreover, the probability of the accumulated wealth being below the total contributions (ie, negative overall return) has fallen to 5% for equities, whereas it has remained relatively high (24%) for gilts.

Thus, historical return patterns illustrate that investment over longer time horizons significantly reduces the probability of negative overall returns, and that

Table 1 Probability of negative overall returns on pensions investment decreases over longer time horizons

Investment horizon	Total contributions (£)	Investment allocation	Median accumulated wealth (£)	Probability of accumulated wealth being below total contributions	
				Probability with historical return parameters (%)	Probability with historical return parameters, but annual volatility of equity at 30% (%)
One year	1,000	Equities	1,069	38	41
		Gilts	1,012	46	46
Five years	5,204	Equities	6,445	26	31
		Gilts	5,415	41	41
30 years	38,407	Equities	132,253	5	10
		Gilts	50,048	24	24

Note: Historical return parameters are calculated on the basis of real annual returns between 1950 and 2007. The historical return parameters are: average annual real equity returns of 6.95% and standard deviation of 23.32%, average annual real gilt returns of 1.24% and standard deviation of 12.75%, and covariance between real equity and gilt returns of 1.43%.

Source: Oxera calculations, based on returns data from 'Barclays Equity Gilt Study', 2007 and 2008.

investment in gilts over longer periods may mean forgoing significant returns compared with equity investment.

Clearly, the historical risk–return profile does not necessarily hold in the future. For example, the recent market turmoil gives rise to the possibility that adjustments in capital markets are taking place that could change this profile—eg, it is possible that the volatility of real equity (and/or bond) returns may have permanently increased from historical levels.

As an illustration of the effect that this would have on the DC pension simulation results, consider an (arbitrary) increase in the volatility of real annual equity returns to 30% (from 23.32%). As presented in Table 1, there is a change in the dispersion of outcomes under the equity investment strategy. More specifically, the probability of obtaining less than the total contributions at the end of the investment period is higher—for a 30-year investment horizon the probability increases from 5% to 10% if the standard deviation of equity returns is raised to 30%.

The simulation results presented in Table 1 illustrate that, over longer investment horizons, the probability of being left with less than the contributions decreases under both equity and bond investment strategies, but the gap between the two strategies widens. So, after 30 years, there is still a 24% probability of getting back less than the contributions if investments are made in gilts, but only a 10% probability with equity, even with a higher-than-historical equity return volatility. This is not say that one investment strategy is better than another, but to highlight the fact that the investment horizon plays a significant role in shaping the risk–return profile of investments and thereby the expected wealth at retirement.

Does timing matter? The impact of market downturns

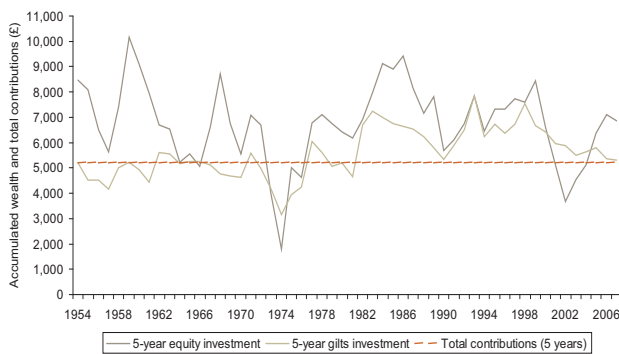
Market downturns can clearly have an immediate negative impact on pensions savings. However, historically, there have been periods of negative returns and periods of positive returns (see Figure 1)—thus the negative impact may 'average out' if the investment horizon is sufficiently long. The more unfavourable outcomes are likely to occur if the end of the pension accumulation phase coincides with a market downturn. That is, timing matters.

To illustrate the possible effect of market ups and downs on pension wealth accumulation, consider a group of investors, each of whom starts to invest their pension contributions in a new year, beginning with 1950. For example, for an investment period of 30 years, the first investor starts contributing in 1950 and their accumulation phase ends in 1979, whereas the last investor starts in 1978 and ends in 2007. Contribution levels (and other assumptions) are the same as those assumed in the above simulation model.

Figures 3 and 4 below show the accumulated pension wealth (as well as the total contributions paid) for each of the individuals based on historical returns of equity and gilts, for five-year and 30-year time horizons, respectively.

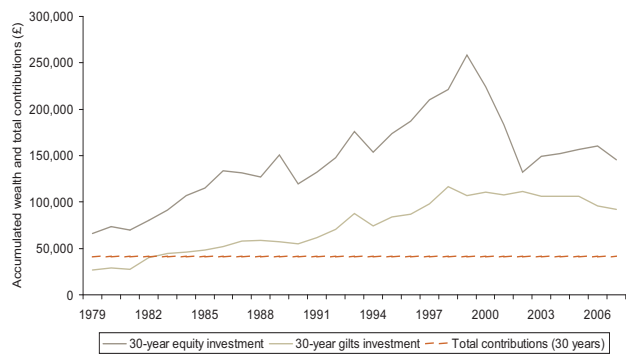
For the five-year investment horizon, there is a significant dispersion in the accumulated wealth, especially for equity investment. For example, the individual who invested in equities and withdrew the accumulated wealth in 1974 lost more than half of their total contributions, whereas the total contributions were nearly doubled for those individuals withdrawing in the mid-1980s. In line with the simulation results above, the

Figure 3 Accumulated wealth at the end of five-year investment period based on historical returns, 1950–2007



Source: Oxera calculations, based on data from 'Barclays Equity Gilts Study', 2007 and 2008.

Figure 4 Accumulated wealth at the end of 30-year investment period based on historical returns, 1950–2007



Source: Oxera calculations, based on data from 'Barclays Equity Gilts Study', 2007 and 2008.

accumulated wealth over the five-year time horizon has, in the majority of cases, been higher for equities than for gilts. However, the worst outcomes (1974 and 2002) are related to equity investments.

As with the simulation results, the picture changes significantly when 30-year investment periods are considered. Based on the actual historical asset return series, investment in equity has never delivered negative overall returns, irrespective of when the accumulation started or ended, and always outperformed investment in gilts. Market downturns, such as the one negatively affecting equity returns at the beginning of this century (see Figure 4), have an impact on the accumulated wealth—but even then the overall return from equity investment has been positive and significantly above the overall return on gilt investment.

Even though timing may play a role in the accumulation of pensions savings, individuals rarely have control over it (eg, they cannot change their age and may have limited flexibility regarding their retirement date). Furthermore, consistently beating the market by 'buying low, selling high' is difficult, and there is very little empirical evidence that individual investors actually manage to do this. The current turmoil and fall in stock markets is likely to have made an impact on the DC pension wealth that those retiring now (as opposed to, for example, one year ago) have available for their retirement, especially if the investments have been in assets that have experienced significantly negative returns. However, appropriate pension investment strategies may mitigate some of the risks associated with

unfavourable timing. As an example, life-cycle investment in its simplest form ensures a long holding period for equities, thus giving potential for wealth accumulation at comparatively high returns and low long-run risks, and switching into bonds as the retirement date approaches may enable the investor to benefit from the lower risk of bonds in the short term, if the risk–return profiles for equities and bonds are similar to what they have been historically.

Concluding remarks

It is not difficult to see that market crises and asset return collapses can have an impact on pensions savings. However, DC pensions are long-term investment vehicles, so, ultimately, it is returns over the long run that matter. As the analysis of historical return patterns and simulations based on them shows, negative returns have tended to 'average out' over long time horizons—especially so for equities—making it much less likely that the overall return on retirement would be negative, compared with short-term investments.

Nevertheless, unfavourable timing can mean that a significant proportion of the accumulated pension wealth gets wiped out, even if the individual still has more accumulated wealth than under other possible investment strategies. These risks may be mitigated by appropriate investment strategies that take into account the increased vulnerability of pensions savings nearer retirement. Product solutions exist and are being developed in the market to suit individuals' retirement needs and to mitigate the risks associated with capital market downturns.

¹ Markets data from www.ft.com.

² The shift to DC occupational pensions is discussed in Oxera (2008), 'The Shift Towards Defined-contribution Pensions: Are the Risks Overstated?', *Agenda*, February. For a more detailed analysis, see Oxera (2008), 'Defined-contribution Pension Schemes: Risks and Advantages for Occupational Retirement Provision', prepared for the European Fund and Asset Management Association, January. Both are available at www.oxera.com.

³ Geometric mean, or average annualised returns. Source: 'Barclays Equity Gilt Study', 2007 and 2008.

⁴ Returns on equities and gilts presented in this article are returns on diversified indices and may not necessarily be representative of returns on individual equities or gilts. In particular, the pattern of historical returns on any individual equity or gilt may have differed substantially from the returns on diversified indices—for example, the diversification typically leads to a lower standard deviation of the returns (ie, lower risk).

⁵ Annualised returns measure average returns per year for each of the years of holding. For example, suppose that the investment horizon is three years, and annual returns are 10%, -8% and 5%. The total return at the end of the three years is 6.26%, which is equivalent to annualised returns (ie, average returns) of around 2% per annum. Thus, annualised returns for a three-year investment period are calculated as a geometric average of the three annual returns. Note that overlapping periods are used; however, the conclusions are not altered in any significant way if non-overlapping periods are used.

⁶ A similar model is described in more detail in Oxera (2008), 'Defined-contribution Pension Schemes: Risks and Advantages for Occupational Retirement Provision', prepared for the European Fund and Asset Management Association, January.

If you have any questions regarding the issues raised in this article, please contact the editor, Derek Holt: tel +44 (0) 1865 253 000 or email d_holt@oxera.com

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