Age-dependent investing is best for rational life cycle investors

New research shows that the best funding and investment strategies in defined contribution pension plans when members are behaving rationally depend on the member's age

An age-dependent investment strategy called 'stochastic lifestyling' – which takes into account an individual's human capital as well as their financial wealth – is a better investment strategy in defined contribution pension plans than the more conventional 'deterministic lifestyling' (with its mechanical switch from equities to bonds over a pre-set period prior to retirement).

This is one of the findings of a major new study by the Pensions Institute at Cass Business School, part of City University London. The study investigates the optimal funding and investment strategies in defined contribution (DC) pension plans.

Despite plan members' well-known aversion to annuities, the study also identifies 'phased annuitisation' as a critically important component of a well-designed plan.

The study, directed by Professor David Blake, Director of the Pensions Institute, and Dr Douglas Wright, Senior Lecturer at Cass, examined a new model of optimal life cycle financial planning behaviour which assumes that the plan member is fully economically rational.

The study identified three factors which people should take into account when designing their DC pension plans. These are: their human capital as represented by their salary profile over their career (in particular, the age at which they reach their peak salary), their attitude to risk, and their preference for current versus future consumption (measured by their personal discount rate).

The research has implications for the popular model of single 'one size fits all' default investment strategies which do not have the flexibility to accommodate these personal factors.

Professor David Blake comments: "this study highlights the inherent problems with default funds. When it comes to the optimal investment strategy for a DC pension plan, three factors – salary profile, attitude to risk and personal discount rate – need to be taken into consideration. These factors vary too much from person to person for one default fund to fit all circumstances. But we don't need hundreds of different funds either – people shouldn't be overwhelmed by choice – a very small number of well-defined choices will suffice."

The research has important implications for the optimal design of DC pension plans:

- There is a role for age-related contribution rates. Greater contribution rate flexibility would allow for the preferences of individual members to be more precisely recognised
- An annuity is a critically important component of a well-designed pension plan. As a result of the mortality premium inherent in the return on a life annuity, the full amount of the pension fund should eventually be annuitised in old age (assuming no bequest motive). This is true despite the well-known aversion to annuitisation of plan members who tend to underplay the longevity protection annuities provide and overemphasise the typically very low probability of dying soon after retirement and thereby 'losing' control of their pension fund
- It is important to get reliable measures of a member's risk aversion and personal discount factor. This can be achieved using appropriately designed questionnaires

- It is very important to incorporate the career salary profile in the plan design
- An investment strategy involving a switch from equities to bonds as members approach retirement, whilst appropriate, will be dependent on past investment and salary growth experience, unlike traditional lifestyle investment strategies
- The optimal equity weight in the portfolio immediately prior to retirement is not reduced to zero – rather it depends on the risk attitude and personal discount rate of the plan member.

So what does the optimal DC pension funding and investment strategy look like? According to the research:

- Rather than remaining constant over time, it involves an age-dependent annual contribution rate. To maximise their standard of living over their life cycle, individuals should wait until they are several years into their career before starting to contribute to a pension plan. Workers are better off consuming their initial low incomes, rather than saving them. As an individual's income grows a worker can save more comfortably for his or her retirement. For a male worker with a typical career salary profile, the optimal contribution rate increases steadily from zero before the age of 35 to around 30-35% after age of 55.
- The optimal investment strategy is also age-dependent. Pre-retirement, the optimal strategy is 'stochastic lifestyling'. It is optimal to begin with to invest 100% of the contributions into the pension fund in equities (or a diversified growth fund). As the retirement date approaches, the weight in equities is reduced and the pension fund is switched increasingly into bonds. So far, this looks similar to deterministic lifestyling. However, the switch away from equities is not predetermined, rather the optimal equity weighting depends on what has been happening to equity returns and labour income. Stochastic lifestyling is justified by recognising the importance of human capital (defined as the present value of lifetime labour income) and treating it as a bond-like asset (since it generates a fairly predictable labour income stream) which depreciates over the working life of the plan member. The initial high weighting in equities in the pension fund is intended to counterbalance the high initial weight of human capital in the combined 'portfolio' of human capital and financial wealth. A young person will typically be human capital rich and financial asset poor. As the share of the pension fund in the combined portfolio rises stochastically, the weighting in equities falls stochastically, while that in bonds rises to counterbalance to stochastic decay of human capital over time
- Depending on the member's risk aversion, there could still be significant equity holdings in the pension fund on the retirement date. For those with reasonable ranges of risk aversion, equity weighting at retirement varies between 20% and 50%
- At retirement, the optimal strategy is 'phased annuitisation'. On retirement, the bonds in the pension fund are sold to buy a life annuity, thereby securing lifelong income protection for the member as well as benefiting from the 'mortality premium' in the annuity return
- Each year that the member survives, the return from buying additional annuities increases (as a result of the mortality premium increasing exponentially with age) and some of the equities are sold to buy more annuities. There comes a point when the mortality premium exceeds the equity risk premium. At this point, when the member is around age 75, the entire residual pension fund is switched to annuities whatever the member's attitude to risk (assuming no bequest motive)
- For a member with lower risk aversion and a higher personal discount rate, the length of time over which the pension fund is fully invested in equities is increased and the length of the switchover period into bonds prior to retirement is reduced.

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Notes to editors
'Age-Dependent Investing: Optimal Funding and Investment Strategies in Defined Contribution Pension Plans when Members are Rational Life Cycle Financial Planners' by David Blake, Douglas Wright and Yumeng Zhang (pensions-institute.org/workingpapers/wp1111.pdf).

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