

Target-driven investing is best for investors with behavioural biases

New research reveals that the best investment strategies in defined contribution pension plans when members suffer from loss aversion are target-driven

When designing defined contribution (DC) pension plans, financial economists usually assume the plan member is a rational life cycle financial planner; an 'econ' to use the terminology of Richard Thaler and Cass Sunstein in their book *Nudge: Improving Decisions about Health, Wealth, and Happiness*. To this end they choose the investment strategy which maximises the expected utility of the pension fund value at retirement.

However, growing evidence suggests real world investors (called 'humans' in *Nudge*) do not behave in accordance with expected utility theory.

A major new study by the Pensions Institute at Cass Business School, part of City University London, investigates the optimal investment strategies in defined contribution (DC) pension plans for these 'human' investors. The study finds that, for these investors, target-driven investing is key.

Professor David Blake, Director of the Institute, who led the research alongside Dr Douglas Wright, Senior Lecturer at Cass, says: "Real world investors suffer from behavioural biases and are prone, among other things, to overconfidence in their investment abilities, regret and, especially, loss aversion. They also tend to monitor the performance of their portfolios (particularly their long-term portfolios) too frequently. As a result, they tend to become risk averse when winning and sell winning investments too quickly, and avoid cutting losses and even take extra risks when they have made losses."

The researchers recommend a new target-driven approach to deriving the dynamic optimal asset allocation, to counter this loss aversion. They identify the 'threshold' strategy as the optimal investment strategy under loss aversion. With this strategy, the weight in equities is increased if the accumulating fund is below a set interim target (since plan members are risk seeking in the domain of losses) and is decreased if the fund is above target (since plan members are risk averse in the domain of gains). When close to each target (whether above or below), the plan member has the lowest equity weighting (for that target) in order to minimise the risk of a significant loss relative to the target.

If, however, the fund is sufficiently above the target, there is a discrete change in the investment strategy and the equity weighting is increased (subject to the member's degree of risk aversion in the domain of gains), since the risk of the fund falling below the target is now considered to be acceptably low. This strategy of increasing the equity weight as the fund value continues to rise above the target is consistent with the investment strategy known as 'portfolio insurance'.

As the retirement date approaches and assuming the fund is on target, the overall equity weighting begins to fall and the value of the fund is 'banked' by switching to lower risk investments, such as bonds. The strategy is highly focused on achieving a target replacement ratio at retirement.

The switch to a more conservative asset allocation strategy is implemented at lower current fund values (relative to target) and at a lower age the higher is the member's loss aversion ratio. For example, if the loss aversion ratio is 4.5, then a loss of £1 makes the plan member feel 4.5 times worse off than a gain of £1 makes the member feel better off. Although the mean replacement ratio falls as a consequence, the expected shortfall from the target decreases.

The effect of higher risk aversion in the domain of gains leads, unsurprisingly, to an earlier switch out of equities and a lower mean replacement ratio, but also to a lower expected shortfall. The effect of greater risk seeking behaviour in the domain of losses leads to a later switch out of equities, a higher mean replacement ratio, a higher probability of achieving the target, but also a higher expected shortfall.

The greater the weight attached to the interim targets (relative to the final target), the less aggressive is the investment strategy adopted, although the overall impact is fairly marginal. In practice, the key factors influencing the relative significance of the interim targets are likely to be the frequency and quality of the fund performance information given to the members.

A discount rate is needed to find the value of the interim targets. Despite the controversy surrounding the choice of discount rate in valuing pension liabilities, the study found that the level of the discount rate appears to have very little impact on the optimal asset allocation in a loss aversion framework.

Compared with the 'econ', the 'human' loss-averse plan member is committed to achieving interim and final target fund levels and, accordingly, adopts a more conservative asset allocation strategy. Although this leads to a lower mean replacement ratio at retirement, there is a greater likelihood of achieving the desired target replacement ratio and a lower expected shortfall.

If the threshold strategy is successful in meeting the series of interim targets, the overall equity weight will tend to fall with age, since the fund is in line to meet the final target fund level at retirement. Although this is similar to what happens in conventional (deterministic) 'lifestyle' strategies, the target-driven strategy is very different. In particular, whilst conventional lifestyle strategies typically involve switching mechanically from 100% equities only in the last 5 to 10 years before retirement and often end up holding 100% of the fund in bond-type assets at retirement, the optimal strategy under loss aversion involves a much more gradual reduction in the equity holding if the fund remains close to the sequence of targets. If, however, the fund is either well below or well above a particular target, even one near to the retirement date, the optimal equity holding will be high. Compared with a traditional deterministic lifestyle investment approach, the optimal target-driven investment strategy significantly increases the likelihood of achieving the chosen target, thereby providing a much greater degree of certainty in retirement planning.

Professor David Blake comments: "The risks inherent in the traditional deterministic lifestyle strategy appear to be much higher than generally understood. Thus, for DC plan members who seek greater certainty in retirement planning, the investment strategy adopted over time needs to be far more focused on achieving the specified target replacement ratio. Setting the

investment strategy in a defined contribution pension plan within the framework of loss aversion therefore has much to recommend it. However, the framework is not easy to implement since it requires the solution of a nonlinear dynamic programming problem whenever there is new information about key state variables (interim fund level and current labour income). Nevertheless, in practice, it should be possible to tabulate the optimal asset allocation in terms of member profile characteristics (such as age and occupation) and values of the key state variables. Financial advisers would then be able to advise on the appropriate investment strategy for the coming year.”

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Notes to editors

In the paper loss aversion is defined in terms of gains and losses in wealth relative to a pre-defined reference or endowment point, rather than in terms of changes in the absolute level of total wealth, as with expected utility theory. Pension plan members are assumed to have a target replacement ratio at retirement (the ratio of pension income immediately after retirement to labour income immediately before retirement). This translates into a target pension fund at retirement which will depend, in part, on their longevity prospects during retirement. Members are assumed to be loss averse with respect to the target retirement pension fund and to a series of annual interim target fund levels prior to retirement. The interim targets reflect the discounted value of the final target retirement fund level.

'Target-Driven Investing: Optimal Investment Strategies in Defined Contribution Pension Plans under Loss Aversion' by David Blake, Douglas Wright and Yumeng Zhang (pensions-institute.org/workingpapers/wp1112.pdf).

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