

THE LAST WORD BARRY RILEY



Can mathematics rescue a wounded investment industry?

Conventional asset allocation practices have ended up creating a pensions crisis, so might dynamic stochastic optimisation – using a model to predict the outcome of a random series of events – provide an answer?

The rapid growth of defined contribution pension plans presents a particular problem. As UK sponsors close their defined benefit schemes – for which a single investment strategy is set by trustees – it becomes necessary for asset allocations to be chosen for, or by, each individual member.

Ideally, assets of various well-chosen varieties could be fed into a black box.

This could be gently cranked at intervals for 30 or 40 years, and then a risk-controlled pension would be delivered.

While there's life there's hope. And there was a good audience for last week's presentation at the Institute of Actuaries in London on Global Asset Liability Modelling by a team headed by Michael Dempster, a professor at Cambridge University's Judge Institute of Management.

Here is the challenge: is there a reliable way of using rigorous mathematical techniques to protect investors from the worst of the downside risks, while allowing for the possibility of better returns than offered, for instance, by a fully matching asset such as a zero coupon government bond?

Only a full range of equities, bonds and other assets divided into national or industrial sectors with

weak correlations would allow the potential returns to be maximised.

Economic, or other, models can be used to generate predictions of returns in the capital markets, and the inherent uncertainty can be represented by means of the generation of a large number of alternatives through so-called "Monte Carlo" simulations.

Dynamic stochastic programming is then employed to find optimal solutions. The objective is to co-ordinate with the utility functions of the individual investors – in other words, to generate asset allocations compatible with the risk tolerance and time horizons

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of the individual DC plan members.

At present, basic "lifestyle" models are used to switch from equities to bonds as an individual approaches retirement age and the annuity risk looms larger.

Until recently, dynamic asset modelling has been considered excessively complex, even by the experts.

It's certainly heavy going: the techniques vary from "nodal partition matrices" to "nested Benders decomposition".

But the concepts have been extensively developed in the derivatives sector, and

enthusiasts say they may now be applicable on a practical basis to portfolio management.

So much for the theory. Several actuaries at the meeting were distracted by practical problems such as simple communication. How can the downside risks of even an optimal solution be admitted to a typical DC pension scheme member?

And is human judgment, however fallible, preferable to computerised optimisation? After all, there is a danger that the machine may make a ghastly mistake. If widely adopted, such models might affect the behaviour of the markets.

Moreover, much depends on the quality of the data and the assumptions that are entered into the models. As one speaker put it, optimisation tools can produce nuggets, but it should not be assumed that they are real rather than fool's gold.

Is it all fanciful? It may well turn out to be, and it was generally agreed that much more work needed to be done.

But David Wilkie, the doyen of actuarial modelling, suggested in winding up the discussion that the subject was "the most important one that actuaries face".

Certainly there are big commercial possibilities. The research underlying the paper was partly financed by Pioneer Investment Management, an Italian-owned but Boston-based fund manager keen to develop a state-of-the-art asset-liability management system to support its pension products.

Meanwhile, back in the real world, the latest challenge is posed by the

political utility function: the proposed European directive on cross-border pensions may be tightened so that its asset allocation limits fit German preferences.

Last week, British employer organisations and the UK's National Association of Pension Funds complained that "amendments have been proposed which could upset the delicate balance that has been achieved".

The politicians have their own mysterious principles – and mathematics is simply not their language.



Risky business: Cambridge professor Michael Dempster

NEXT WEEK: Philip Coggan