# Retire Comfortably?

New products to support lifestyle advice over a lifetime are already available, say **Michael Dempster** and **Elena Medova**

Pension systems are in crisis. Every day brings dire warnings of future poverty for large numbers of older people across the globe. Governments and corporations are pushing the responsibility for pensions and healthcare back to individuals. With current demographic trends the present workforce will be faced with the problem of significant 'pension gaps' which unless somehow covered will force drastic changes in post retirement lifestyles. The relatively affluent are no exception. Last year *Fortune* magazine devoted a special issue (July 2006) to the problem subtitled 'Take control of your future' which began 'Traditional pensions are melting away…'. By and large however the asset management industry remains focussed on asset returns measured by relative performance and treats individuals' liabilities at best in aggregate as asset return goals. Financial planning/wealth management advice for individuals sorely needs innovation.

We describe here a recently developed system for the support of lifestyle planning and lifelong asset allocation designed to meet this challenge. As an easy-to-use tool for financial advisors, it employs technologies of asset liability management (ALM). It has been developed for lifelong planning for individual households and sets investment risk attitudes over household lifetime relative to lifestyle goals. Potential users of versions of this innovative system are a broad spectrum of wealth managers and personal financial advisors. Private bankers can use the system's highest level features to construct and maintain tailored portfolios for sophisticated clients with very detailed analyses of current and future financial strategies. Financial advisors – both independent and employed in retail banking networks – can use the basic functionality of the system with its interactive 'gaming' features to advise middle income households on retirement planning. A 'lite' version of the system for mass use by independent consumers can be delivered over the Web. The current version of the *i*ALM system for individual asset liability management has been designed for US clients where the tax shielded 401K defined contribution system has long been in place. Versions of the system are currently under development for the growing retirement market in the UK and Europe.

The management of the personal finances of a household of any wealth is very different from that of institutional funds, such as mutual funds, pension funds or insurance funds, in that the events connected with liabilities cannot be smoothed by diversification over a large number of investors or events. Personal liabilities are sharp and often at fixed points in time (children's education, weddings) or discretionary (house purchase, retirement) and highly uncertain (future income, redundancy, illness, death, need for long term care). This poses technical requirements on lifetime planning which are complicated by the practical requirement of accommodating a client's lifestyle and discretionary goals over a possibly very long planning horizon which depends on the age of the individual involved.

A software engineering challenge for such an advisory system is the design of easy-to-use screens suitable for a general household from a variety of age and wealth groups with given income prospects, liabilities and goals through life which must easily reflect changes in individual circumstances as the client's lifelong plan is updated from consultation to consultation with the advisor. These considerations specific to the client include spending on living prior to and in retirement and spending on specific discretionary goals within a range of desirable, acceptable and

## Global pensions crisis

From 1975 to the present the global *dependency ratio* – the ratio between retirees and workers – has increased from 35 to 50 percent. The OECD forecasts that this ratio will continue to rise, reaching 70% by 2040. In the developed world, largely due to rising affluence and advances in health care, people are living longer. For example, life expectancy in the UK has risen from 76.7 years to 80.2 years in the past 20 years and is forecast by Tillinghast Towers Perrin to rise to 84.7 years in the next 20. According to McKinsey and Company the number of people in the UK aged 60 or over is projected to quadruple, from 12.2 million in 2000 to 20.4 million in 2040, and their share of personal financial assets to rise from 68% to 76%.

This has forced governments to progressively reduce planned state retirement benefits across the developed world, nevertheless with significant expenditures by governments forecast to range from 5% to 22% of GDP at their peaks around 2040.

In Europe there are currently about 45 million people now aged between 40 and 60, and another 45 million aged 60 or over. But, as is well known, the habits and lifestyle of these two groups are very different. Baby boomers are healthy, better educated and more affluent, while subscribing to liberal, individualistic and even counter-culture values and remaining proactive and participatory in politics and society generally. The older group, although adapting to the Web culture, are much more conservative and less inquisitive, tending to be more traditional and considerate of their children, for example, with regard to bequests. They tend to have a significantly greater propensity than baby boomers to continue to save in retirement, keep assets aside for inheritance and store assets against a rainy day. On the other hand, baby boomers are more likely to travel extensively and spend extensive periods, or even move, abroad.

More than two thirds of both groups perceive the possible effects of the pensions crisis on their personal lifestyles – savings and pensions eaten by inflation, poor financial returns, seriously reduced state pensions – but fewer than one fifth have taken any steps to mitigate these risks. A similar situation applies to household health and mortality risks, such as need for long term care and outliving current wealth, but an even smaller proportion have taken steps to protect against these contingencies.

This situation creates an enormous opportunity for the EU financial services industry, with a staggering three quarters of a trillion pounds projected to be added to all forms of retirement saving in the five year period to 2011 in the UK alone.

minimum levels for each item. The major impacts of uncertain events, such as a requirement for long term care or a family death, must also be accommodated, together with, for example, medical expenses over life depending on states of health and insurance arrangements. The task of assembling many pieces of information about individuals' incomes, liabilities and discretionary spending, to say nothing of forecasting returns on available investments, has always been tedious. All efforts have been made to simplify this process for the *i*ALM system and to present its recommendations in lifetime summaries as easy to use as possible.

Underlying the system is a mathematical optimization problem formulation which involves the modelling of: many economic risk factors and market asset returns, individual's liabilities in terms of both random discrete events and continuous processes, random lifetimes of individuals from different age groups and highly individual preferences for goal oriented consumption, savings and investment. Specific priorities are allowed for individual lifestyle goals. The *i*ALM system's unique feature is its ability to determine optimum values for many decision variables – spending, borrowing, saving, investment, etc. – across time and simultaneously for multiple future scenarios of random processes and events representing uncertain markets and life circumstances. The current version of the *i*ALM model includes 20 random processes that vary over a client's lifetime (up to 90 years forward) and around 200 mathematically formulated conditions (constraints). A typical client problem might involve a half a million variables and a similar number of constraints. Implemented with the highly efficient *STOCHASTICS™* suite software used for institutional fund management applications, *i*ALM has made modelling and solving such problems viable in a few minutes on an average desktop or laptop computer. The result is an advisory tool that can be used in an interactive dialogue with the client to analyze retirement and savings alternatives.

Leading edge research in many fields underlies the *i*ALM implementation. In particular, the system provides a solution to an individual client's problem instance which reflects the behavioural aspects of investors in the optimization objectives framed in terms of the risk-adjusted present value of lifetime household spend. Other aspects of recent findings in behavioural finance are also incorporated. Investors' tendency to underdiversify is automatically compensated for, as is excessive risk taking due to irrationally heavy discounting of the future – a tendency ameliorated but not expunged by increasing levels of education. Depending on temperament people tend to overestimate their financial prospects and abilities to varying degrees to result in unrealistic discretionary goals. The *i*ALM system's 'sanity check' helps to overcome this lifestyle optimism by helping the client to adjust financial goals until the required return from existing assets is brought into the range of the practically achievable. This quick 'sanity check' is designed for interactive use before a lifetime plan optimization is attempted.

The optimal plan readjusts the client's attitude to risk appropriate to their lifestyle goals, which vary over time. This optimal plan contains spending and portfolio recommendations both for now and for the current view of future

## Households want the right retirement advice

In the EU there is a strong unsatisfied demand for retirement advice supported by innovative products The desire for such advice was expressed by 2 of 5 British, 3 of 5 German and 1 of 3 Italian affluent consumers respectively – both working and retired – in a survey conducted by McKinsey and Company about a year ago. Interest was expressed in planned investment decumulation, total financial plans, annuities, mortgage equity release and insurance to pay the costs of retirement or nursing homes in the later stages of life.

The financial services industry, in particular fund management, has responded to this growing demand for retirement products by schemes for returning ailing corporate defined benefit (final salary) plans to solvency, by introducing defined contribution (individual investment) schemes and more recently so-called hybrid schemes which give capital and inflation protection guarantees to savings while adding value through absolute – i.e. independent of current market conditions – return and derivative strategies. These solutions however require serious innovation in fund management technology and risk management, to say nothing of major organizational, marketing and distributional transformations of the industry and they are only just beginning.

One such technical innovation recently introduced is the concept of liability driven investment (LDI) which uses a derivative-based inflation-indexed income stream from an investment banking swap counterparty to hedge change in pension liabilities, adds value with a mixture of traditional and alternative fund management strategies and strictly manages risk. The long run effectiveness of this four year old institutional solution behind indexed or guaranteed investment products is questioned by many, who advocate more personal approaches. Certainly sound financial advice, together with proactive product and investment proposals and knowledge of client history, was cited by two thirds of affluent respondents to the McKinsey survey as crucial to satisfactory relationships with banks and independent financial advisors.

But is current financial advice for lifetime financial planning and asset allocation sound? The best of current advice is based on investment optimization, introduced by the Nobel Laureate Harry Markowitz over fifty years ago, which is applicable only to short time horizons. Investment risk is measured by variability of returns and clients are advised to make risky investments while they are young and become more risk averse as they approach retirement. Much effort is expended to devine a clients' attitude to risk. Lifestyle goals such as retirement, children's education, weddings, second houses, boats, cars, etc. (when not simply aggregated) are treated in terms of separate investment pots with relative priorities reflected by contribution rates. All such funds are balanced only in terms of current market conditions and clients' 'risk appetites' and no account is taken of random events in life like sickness or death, uncertain future incomes and costs, or varying priorities over time. As a result, the investment strategies proposed tend generally to be overoptimistic.

Does this current best-of-breed advice accord with practical client reality? A recent (2005) Bank of Italy survey of investors suggests that the answer is no! For example, the young were found to hold less equity; in fact the highest equity proportion (25%) was held by the 65-74 age group. In general the survey showed attitudes to risk to depend on many factors other than age. These findings accord with common sense and they identified human capital (lifetime future earning capacity), family structure, wealth base and housing needs as most critical to household investment choices.

Naturally factors affecting portfolio choices change with age at a pace unique to individuals. Uncertainty about the future is highest when householders are young and reduces with age. Traditional advice and products allocate risk precisely when uncertainty is highest. Depending on household circumstances such advice may also incorrectly limit exposure to risky assets approaching retirement, just when more certainty about future lifestyle could allow more investment risk taking. In general a household is *not* a *static* entity, it may represent different households over time as desired lifestyles change.

decisions. These decisions, such as expected portfolio evolution over a lifetime, provide useful forward information. All aspects of the client's forward financial plan can be examined on all future scenarios in a 'what if' mode. Forewarned is forearmed! There are many features of the system which aid this process in terms of cash flow and wealth evolution, balance sheets, goal achievement likelihoods, etc.

Using *i*ALM each implemented plan is expected to be updated periodically, or at the occurrence of major lifestyle events, to correct for imperfect forecasts and to take account of unforeseen events (which are not statistically modelled). The *i*ALM client lifestyle plan treats portfolio allocation decisions at the strategic level by taking a long term view of individual circumstances. It is designed to be used in conjunction with a short term (annual) tactical allocation which can exploit the financial advisor's knowledge at the level of individual investments in funds or instruments. Both levels must of course consider the legal and institutional framework regarding taxation and pension regulations specific to each jurisdiction and these aspects are modularized within the *i*ALM system.

The system has undergone extensive testing on real profiles of US investors including careful reviews of client needs. The behavioural aspects of the systems design recommendations have been tested using its ability to analyze the relationships between current wealth, future earnings, savings and desirable consumption in constructing dynamic portfolios with life-style enabling returns. In addition *i*ALM's performance has been successfully backtested over the past ten years of market conditions and favourably compared to top financial advisor's client recommendations and short term Markowitz mean variance portfolio composition.

The retirement market is the largest and fastest growing opportunity in EU financial services. Similar statements with different time lags are true for Japan, the US, Korea, Russia, China, India, Brazil, etc., providing very long term opportunities for retirement products and services. Traditional retirement products and advice concentrate on short-term market conditions and ignore individual lifestyle choices and potentially significant events. Lifelong lifestyle advice is a crucial element in meeting consumers' real expressed financial needs. Upon it new financial and insurance products can be marketed. In *i*ALM the technology to deliver this advice is a reality today, but focus and organizational changes are required to bring such systems into widespread use.

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