200 years of asset allocation:

Lessons from the pioneers of investing

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Introduction

From the perspective of even the most seasoned investment professional, a series of unprecedented events has occured over the last 40 years. Interest rates have been in almost constant decline. A global financial crisis forced both governments and central banks to step in to support financial markets. The fall in bond yields has led investors to shift into evermore exotic alternative assets.

However, a 200-year view of our industry provides a very different perspective. Many of the challenges we face today have been faced by investors of previous generations. Interest rates were on a downward path for almost the entire 19th century. As now, pension fund and insurance company investors responded by shifting from government bonds to less liquid alternatives.

In the 20th century, two world wars brought not only social and economic devastation but severe financial stress. Investors had to navigate government and central bank intervention in the form of market closures, financial repression, exchange controls, changing monetary regimes, nationalisations and direct intervention in markets.

The current low-rate environment challenges the profitability and solvency of owners of long-term liabilities: life assurers and pension schemes. Craig Turnbull, investment director at Aberdeen Standard Investments and author of *A History of British Actuarial Thought*, brings lessons from history to today's insurance and pension asset managers. Craig sets out how investment strategy evolved in response to the changing environment. He explains how strategic asset allocation policy responded to the major events of history and draws conclusions that challenge the current consensus. This history is British, but the lessons learned apply across the world.

Executive summary

What can we learn from the pioneering investors of the last 200 years? There were three distinct periods. First, the defeat of Napoleon in 1815 ushered in the century-long peace that followed. Second, the First World War marked the start of a new inflationary cycle. The third began with the appointment of Paul Volcker as head of the US Federal Reserve in 1979. Central banks regained control of inflation, marking the start of the greatest ever fall in long-term interest rates.

The 19th century saw the birth of institutional investing. These institutions faced 80 years of falling government bond yields. They adapted by embracing the illiquidity premium in private credit markets.

Insurance companies dominated the investment landscape (and continued to do so well into the second half of the twentieth century). The first influential actuarial paper was published in 1862 by A.H. Bailey, encapsulating two fundamental ideas. First, investment risk should be minimised. Second, investors should take advantage of the illiquidity of their liabilities by investing in higher-yielding illiquid assets. By 1890, 80% of life office assets were invested in non-exchange traded assets. This paper largely set the tone for investment strategy for the next one hundred years.

The First World War marked the start of a new inflationary cycle. Managing the risks of inflation would shape investment strategy from now on. The publication of Common Stocks as Long Term Investments in 1924 alerted pioneering investors to the attractions of equities, including John Maynard Keynes in his role as chairman of the National Mutual Life Assurance Company. Investors shifted into equities – and later property – as the rise of inflation forced a change in strategy. Equity allocations of British life offices rose from 2% at the turn of the century to over 25% by 1961.

The post-war era saw the rise and fall of the defined benefit pension scheme – and of institutional equity investing. By 1970, more than half of the entire British workforce was covered by defined benefit pension schemes. George Ross Goobey transformed pension fund investing after 1947 when he joined the Imperial Tobacco pension fund.

He made three bold moves. First, in 1947 he sold out of government bonds, then yielding less than inflation. Second, in 1955 he persuaded the pension fund to invest 100% of its assets in equities. Third, in 1971 he made the case for investing in property after his views on equities had become the consensus.

The taming of inflation marked the start of the modern era. This era is largely defined by the fall in government bond yields that have made the cost of defined benefit pension schemes untenable. The Boots pension fund has proved to be the poster child of the 21st century, shifting 100% of its investments into long-dated government bonds in 2001. This backdrop has triggered the widespread closure of defined benefit pension funds over the last 20 years, moving the burden of responsibility for long-term saving from institutions to individuals.

Today, three forces are reshaping long-term investment institutions: a low-return world, the modernisation of regulatory regimes and financial innovation. Are there still lessons that can be learned from Bailey, Keynes and Ross Goobey?

For the providers of insurance and pensions, asset allocation strategy is increasingly focussed on managing risk. The shift from equities to fixed income is unlikely to reverse. UK life offices have embraced the lessons of Bailey. A major rotation from public to private credit is underway.

For long-term savers, asset allocation strategy must continue to target returns. The pioneering investors of the past were willing to follow a very different strategy from the consensus. For today's investors, we see two paths for pioneers: investing in private markets and embracing innovation.

These changes are reshaping long-term investment institutions. The large, state-owned asset managers are certainly among the pioneers of today, including the Norwegian Sovereign Wealth Fund's innovations in factor-based investing and the Canadian Pension Plan Investment Board's embracing of private markets. The changing solvency and accounting regimes provide additional challenges for the investors of insurance assets, requiring closer collaboration between investment and actuarial teams.

For individual savers, the investment menu is increasingly being left in their hands. The role of UK life assurance companies and pension providers must adapt to meet their needs. Multi-asset solutions, designed around desired outcomes, will continue to grow.

The successful insurers and pension providers of the future will have learnt the investment lessons of the pioneers of the last two centuries. But they will also be able to translate the language of actuaries and investors into plain English for their end customers. No mean feat!

Part I

The Pax Britannica era (1815 – 1914)

PROSPECTUS.

This Company has been formed for the objects specified in the Memorandum of Association, but primarily as a Financial Investment Trust. Companies established on similar lines have for many years been successfully carried on in London, Edinburgh, Glasgow, Dundee, and latterly in Aberdeen.

The benefits of Investment Trusts to the private investor are now well known. Experience has shown that an Investment Trust, conducted under the guidance of men who have successfully managed similar undertakings, and having its funds spread over a variety of carefully selected investments, can produce satisfactory results with much more certainty than can be achieved by a private individual or by an unallied Trust Company. These results are owing in part to the skill and experience of the men themselves, and in part to the opportunities which their position affords of obtaining participation in underwriting and other financial operations beyond the reach of investors not similarly placed.

Through its Board of Directors and its London Correspondent, the requisites necessary to the success of an Investment Trust have been secured to this Company. The Directors are men whose business brings them in constant touch with matters of finance, and they will have as London Correspondent, Lord St. Davids, who is connected with several successful Investment Companies. Amongst these are the Consolidated and Metropolitan Trusts, the ordinary stock of which stands at 190 and 205 respectively.

Many of the existing Trusts have placed the greater part of their investments in the United States of America and Canada, several companies having been formed with the sole object of placing their capital in these countries. The Directors of this Company, while fully alive to the advantages to be derived from sharing in the development of North America, consider that it will lead to the permanent security of the Company if its investments are not limited to a particular area, which may at any time be subject to financial disorganization from local causes. They will accordingly spread the Company's investments over different parts of the world, both at home and abroad, where, in consequence of commercial development, investments are available equal to those of the North American Continent.

It is provided by the Articles of Association that not more than 10 per cent. of the combined Share and Debenture Capital of the Company may be invested in any one undertaking.

The borrowing powers of the Company on Debenture Stock, Debenture or Deposit Receipt, are limited to the amount of the subscribed and paid-up capital at the time. It is the Directors' intention to issue Debenture Stock as opportunity occurs.

1875: Extract from the Prospectus of The Aberdeen Trust Company Limited, one of three Scottish investment companies that laid the foundations for Aberdeen Asset Management

Source: The History of Aberdeen Asset Management (2013)

The period between the end of the Napoleonic Wars and the start of the First World War was a period of relative peace and economic stability - the Pax Britannica era. The British Empire ruled large swathes of the world and the Industrial Revolution brought unprecedented economic growth.

Peace, stability...and risk aversion

Long-term interest rates fell steadily over this hundred years (see Chart 1). At the end of the Napoleonic Wars the yield on consols, UK government issued perpetual bonds, was close to 5.0%. By the middle of the 19th century the yield was barely above 3% and in the 1890s it briefly dipped below 2%. Lower for longer indeed!

Two major forms of long-term investment institution emerged over this period. First came the mutual life assurance society, generally referred to as a life office, and owned by its with-profit policyholders. Life offices dominated the investment landscape. This was followed by the birth of the defined benefit staff pension scheme, a vehicle for the advance funding of private sector pension provision via a trust structure. Both forms of institution had distinctly long-term liabilities that were illiquid in nature, particularly relative to the liabilities of other contemporary financial institution, primarily banks.

For the inflation-linked liabilities of insurers and pension funds, 19th century inflation was notably different to the 20th century. England slid onto the gold standard in 1717 following a report by Sir Isaac Newton, then Master of the Mint[1]. The price of gold was essentially stable for the next 200 years, up until 1930. However, the war with France led to a suspension of the gold standard between 1797 and 1819, triggering a rise in commodity prices. The restoration of the link to gold was one factor behind the subsequent fall in bond yields and the taming of inflation. For the 40-year period prior to the start of the First World War, consumer price inflation averaged exactly zero.

Life offices

The birth of the life assurance business can also be seen as the birth of the investment profession. The first company offering life assurance with longer-term investment assets was the Worshipful Company of Mercers, starting its annuity scheme in 1699. The world's first mutual insurer was Equitable Life Assurance Society, founded in 1762. It was also the first life assurance company to identify the position of Actuary, appointing William Morgan to the post in 1775. Morgan is regarded as the father of the profession. Equitable Life provided the blueprint for the traditional British mutual life office, replicated by dozens of life offices around the country over the first half of the 19th century. Among them was The Life Insurance Company of Scotland, founded in Edinburgh in 1825, which changed its name to The Standard Life Assurance Company in 1832.

Actuarial studies arrived as a profession when the Institute of Actuaries was founded in 1848 in London, followed by the Faculty of Actuaries in Scotland in 1856. At the time, life office liabilities were largely fixed in nature - especially compared to the latter 20th century bonus- loaded variant of with-profit policy. Surplus capital was relatively modest. As a result, the actuarial appetite for investment risk in these institutions was very low.

Actuaries were primarily focused on mortality rate modelling and liability reserving methods through most of the 19th century. They displayed little interest in investment strategy beyond ensuring it was highly prudent. This started to change in the second half of the century as some influential investment papers began to appear in the actuarial journals. The most important of these papers was written in 1862 by A.H. Bailey[2], who would go on to become President of the Institute of Actuaries from 1872 to 1874. His paper, at a mere five pages, was notably short by actuarial standards, but formed part of the actuarial exam syllabus for the next 50 years.

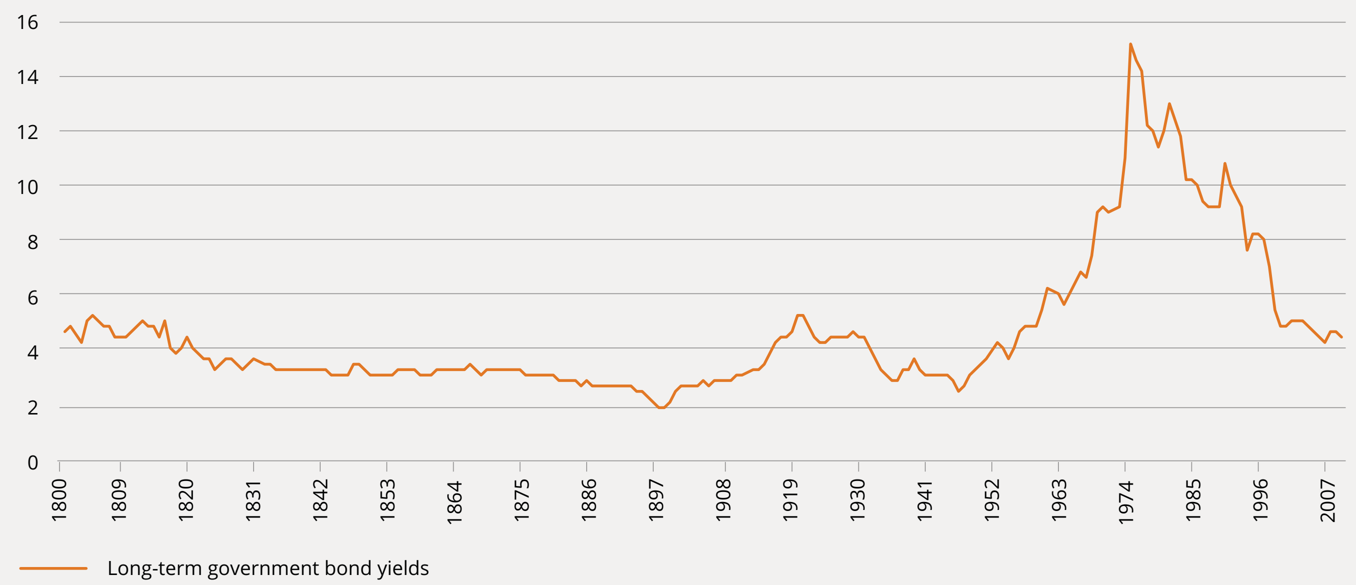
Bailey set out a handful of principles which he advocated as a guide to life office investment strategy. They encapsulated two fundamental ideas.

First, investment risk should be minimised. Credit risk would be maintained at low levels by investing in government debt or loans that were senior and secured on tangible assets. And equity investing was considered beyond the pale.

Second, life offices should take advantage of the relative illiquidity of their liabilities by investing in low-risk illiquid assets that offered an extra yield as compensation for their lack of liquidity. The typical illiquidity premium at the time was around 1%.

Bailey's principles reflected the life office asset strategy of the period and influenced strategy for the remainder of the Pax Britannica era. Life offices invested almost entirely in fixed income assets throughout the century. As long rates fell towards 3%, life offices were motivated to innovate their investment strategy, since with-profit policies were almost always written with a 3% guarantee embedded in the premium calculation. Life offices gradually switched from liquid gilts to illiquid mortgages and other loans of high credit-quality with the aim of capturing the illiquidity premium, as advocated by Bailey. By 1890, fully 80% of British life office assets were invested in non-exchange traded assets – mostly mortgages and especially on agricultural land. The decline in agricultural land prices around the turn of the century meant this strategy led to some stresses for insurance companies. Exposure to government bonds started to rise again in the run up to the First World War. While the liquidity profile of the asset strategy changed significantly during this era, the dominance of fixed income assets in British life office investment strategies was continuous and near total.

Chart 1: Long-term UK government bond yields (1800 – 2009)



Source: Janssen et al (2002), Mitchell (1988)

[1] The Golden Contant, Roy Jastram and Jill Leyland, 1977, updated 2009, [2] Bailey (1862), [3] Morecroft (2017), The Origins of Asset Management from 1700 to 1960

Defined benefit pension funds

Private sector pension fund provision in Britain emerged in recognisable form in the second half of the 19th century. However, the first pension fund was the Chatham Chest, set up in 1590 to pay benefits to disabled seamen[3]. In 1743, the Church of Scotland established the Scottish Ministers' Widows Fund, subsequently extended to professors of the four Scottish 'Ancient' universities: Aberdeen, Edinburgh, Glasgow and St Andrews. An 1853 act of parliament obliged railway companies to establish pension funds. The corporate sector followed suit a generation later, when Reuters created a staff pension fund in 1882. Germany became the first nation to adopt an old-age social insurance programme in 1889, under the leadership of chancellor Otto von Bismarck. The British state pension was established in 1908.

The earliest actuarial thinking around pension fund asset strategy was broadly aligned with the thinking in life offices. Prior to the First World War, pension funds were considered to have long-term fixed liability cashflows, which required an investment strategy that could generate similarly long-term fixed cashflows. The liabilities' inflation linkage was unambiguous, with the employee's final salary determining the pension amount.

Prior to the First World War, however, actuaries gave this little consideration. The benign inflation experience of the previous decades meant that there was no particular reason to consider inflation as a potentially significant long-term risk to the financial health of a pension fund. However, this was soon to change.

Investment trusts

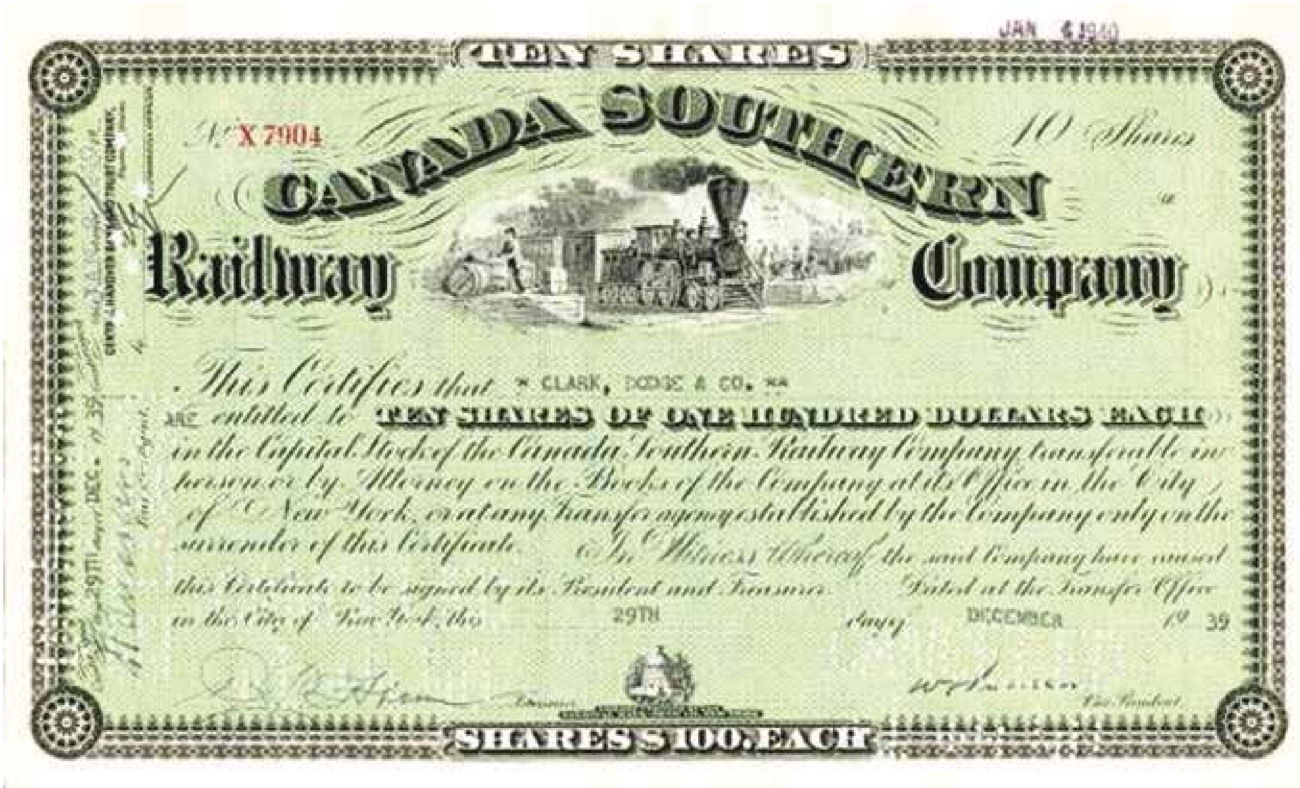
Outside of the world of insurance and pension funds, more adventurous investment models were emerging. The Foreign & Colonial Government Trust was created in 1868. Unconstrained by actuarially-managed liabilities, the Trust was free to take a riskier approach in search of returns.

The UK stock market was not yet an obvious investment choice. Of the 4,859 companies formed between 1856 and 1965, 37% failed due to combinations of fraud and mismanagement. This was also an era of repeated bank failures. The collapse of Overend, Gurney & Co. Ltd in 1866 created a bank run that took down six other UK banks.

Instead, the Trust invested in a portfolio of London-listed foreign bonds – what we would today label emerging market debt – with holdings across the British colonies, Europe, Egypt and South America. It offered its initial investors a 7% yield.

The Scottish American Investment Trust – or First Scottish – followed in 1873, managed by Robert Fleming. This Trust also offered an initial yield of 7% but was entirely invested in US bonds, with 80% of the funds invested in the railroad industry. By contrast to Foreign & Colonial, this was an actively managed portfolio of locally issued bonds. Fleming sailed to the US on a regular basis to carry out fundamental analysis. Investors were handsomely rewarded for investing in the US during a period of rapid economic advancement.

A wave of new issues followed, including the three Scottish investment companies that laid the foundations for Aberdeen Asset Management: The North of Scotland Canadian Mortgage Company (established in 1875); The Aberdeen Trust Company (1911); and East of Scotland Trust (1913).



1868: A bond issued by the the Canada Southern Railway Company, founded in 1868. The Scottish American Investment Trust invested 80% of the portfolio in the railroad industry.

Source: The History of Aberdeen Asset Management (2013)

Part II

The World War years

1941: The London office of Standard Life, which was gutted during the Blitz.

Image reproduced courtesy of Standard Life Aberdeen Archive.

"The financial crisis of 1914 was the most severe systemic crisis London has ever experienced — even more so than 1866 or 2007-2008 — featuring the comprehensive breakdown of its financial markets."

Richard Roberts, Saving the City: The Great Financial Crisis of 1914

The First World War brought social and economic devastation. It also marked the end of the first great era of globalisation and the birth of a new inflationary cycle. Managing the risks of inflation would shape the investment strategy of insurance companies and pension funds from now on.

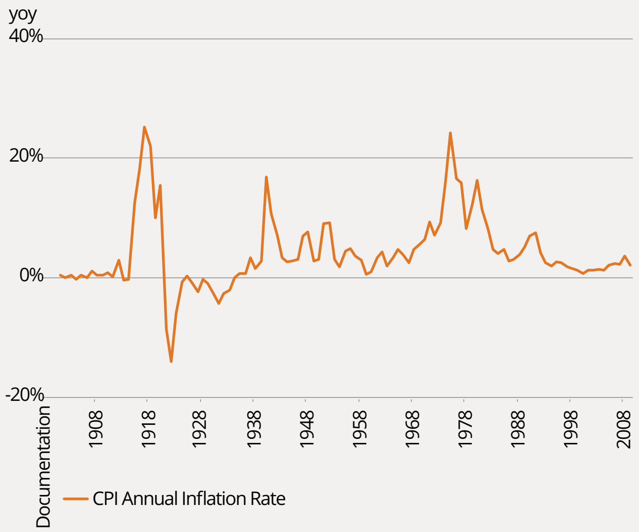
Inflation and the origins of institutional equity investment

The market impact of the war was instant. As conflict became inevitable, investors scrambled to liquidate their holdings. Within days of the outbreak of war, 50 stock markets around the world closed, some for many months[4].

This was both a liquidity crisis and a solvency crisis for the banking sector. The Bank of England was forced to rewrite the rulebook, echoing the recent episode of quantitative easing. Where previously it only accepted the finest commercial bills, 'the bank lowered its standards from first-class to second, and even third-class bills' in the words of William Lawson, a leading financial commentator of the time.

The economic consequences of the First World War had a profound impact on British life offices and pension funds. Inflation started to rise ahead of the conflict and then doubled between 1915 and 1920 (see Chart 2). Long-term gilt yields more than doubled from 2.5% in 1900 to 5.3% in 1920. The asset side of these institutions' balance sheets were therefore sitting on major book losses for the first time in living memory. Actuaries awoke to the risks and started to consider what rampant inflation could do to the liability side of their valuations.

Chart 2: UK CPI Inflation (1900 -2009)



Source: Bank of England, Office of National Statistics

[4] Richard Roberts, Saving the City: The Great Financial Crisis of 1914

Life offices

Government debt soared due to the costs of fighting the war. Life offices underwrote every gilt issuance made during the First World War. This was in part motivated by tax incentives. But it also reflected broader governmental encouragement, or moral suasion. As a result, their liquidity profile moved back towards more liquid assets, and the percentage of holdings invested in mortgages substantially declined over the first quarter of the century. Indeed, illiquid assets would largely remain off the investment menu until the 1990s. The long-term gilt holdings performed poorly in the immediate aftermath of the War as yields increased. In addition, the volatility in long bond prices was far greater than previously experienced.

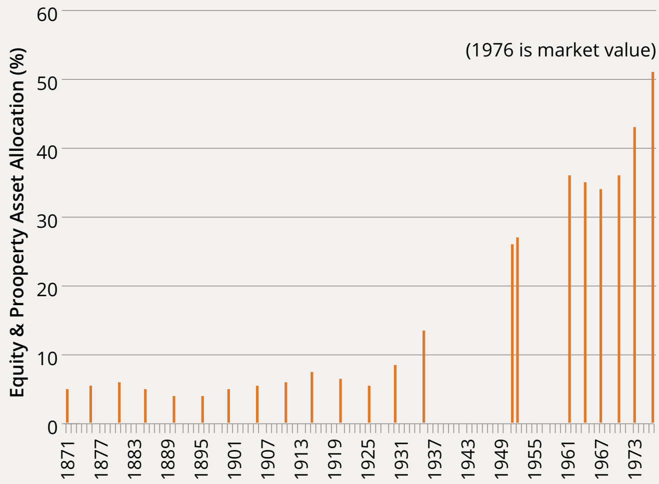
History shows us that investment thinking can be altered by people and ideas as well as by political and economic shocks. John Maynard Keynes was chairman of the National Mutual Life Assurance Society, a medium-sized British life office, from 1921 to 1938. Keynes was also a director of – and investment adviser to – Provincial Insurance company. (The investment arm became Prolific Financial Management and was bought by Aberdeen Asset Management in 1997.) He began to change attitudes towards life office investment strategy during the 1920s and 1930, along with a small coterie of like-minded individuals in the actuarial profession – most notably Harold Raynes, the Chief Actuary of Legal & General.

Keynes was a lifelong believer in investing in ordinary shares. This intuitive preference was reinforced by the publication in 1924 of “Common Stocks as Long Term Investments” by Edgar Lawrence Smith, the US economist and investor. This book analysed the performance of US bonds and equities from 1866 to 1922. It showed that equities had produced better returns than bonds in periods of rising and falling consumer prices. Additionally, Smith pointed out that equities had produced a higher income than bonds – in both inflationary and deflationary environments. In essence, this was an early analysis of the equity risk premium.

Raynes then performed a similar style of data analysis on UK equity and bond returns. His paper, The Place of Ordinary Shares and Stocks in the Investment of Life Assurance Funds, was submitted to the Institute of Actuaries in 1928. It argued that investment in ordinary shares could combat the effects of inflation and would, in all likelihood, produce higher returns than fixed interest securities over the long-term horizons of a life office.

Although life assurance liabilities were entirely specified in nominal terms, there was a view that with-profit policy bonuses should be linked to inflation. The post-war increase in gilt yields that followed life offices’ substantial war-time increases in gilt holdings highlighted to actuaries that bonds could be a volatile and risky asset class. And at this time, there were no index-linked gilts. In the universe of liquid securities, equities and real estate were the only candidates for investors looking to invest in real assets.

Chart 3: Equity and property allocation of UK life assurance companies



Source: A History of British Actuarial Thought, Craig Turnbull

Raynes and Keynes significantly influenced life office investment theory and practice over the next three decades. Equity asset allocations of British life offices increased from 2% at the start of the century to over 20% by 1952 and over 50% by 1976[5] (see Chart 3). Now that equities were recognised as having a legitimate role in life office asset allocation, a natural actuarial question followed: what is a reasonable equity weighting? And, in particular, how much is too much? In other words, what equity risk appetite should life offices have? And what logic should be used to determine this?

G.H. Recknell, Chief Actuary at National Mutual where Keynes was Chairman, was one of the first actuaries to address these questions.

To understand his perspective, we first need to briefly consider the structure of the traditional British with-profit policy of the time. They provided a minimum guaranteed investment return to the policyholder, together with ‘bonuses’: an annual addition to the promised maturity benefit that, once accrued, could not be removed.

Recknell’s view[6] was that the with-profit book’s accrued guarantees should be matched with bonds, and that only the assets of the fund that remained after this matching exercise should be viewed as eligible for equity investment. These residual assets could be substantial in size for two reasons.

First, the policy guarantees were typically low relative to market gilt yields – what actuaries referred to as a bonus loading. And second, the life office may have an accumulated pool of surplus capital from a century or more of under-distribution.

[5] See Dodds (1979)
[6] As expressed in 1937 in the actuarial sessional meeting that discussed Raynes’ second equity paper.

Recknell's approach was straightforward and actuarially prudent. Although it was distinct from the 19th century actuarial view that equity investing was simply an inappropriate asset for life office investment, it remained close to the prudent tradition of avoiding risks that could threaten the long-term sustainable delivery of policyholder guarantees. It was uncontroversial and, in the 1930s, left plenty of room to increase equity allocations from a low starting point. From the late 1920s, life office equity and property allocations started to steadily increase. The Recknell orthodoxy, first voiced in 1937, set the tone for British life offices over the following 20 years[7].

Defined benefit pension funds

In 1921 contributions to pensions were made exempt from tax, triggering rapid growth in pension provision. In 1922, local government staff were granted pensions. By 1936 several thousand private sector pension schemes had been established. However, the evolution of investment strategy lagged behind the insurance industry throughout this period.

[7]For example, see Hayes & Kirton (1952).

The three ages of statistics

David Hand, professor of statistics in the department of mathematics at Imperial College, describes the development of statistics as occurring in three phases that run in close parallel with our story[1].

The first phase primarily consisted of the gathering of information on people to tax and resources to use in war. The birth of modern statistics is often dated to 1662, when John Gaunt developed a framework for demography, including the production of the first life expectancy table. This was followed by the establishment of the Royal Statistical Society in 1834 (Hand is a past-president of the society).

The second phase, between 1890 and 1960, saw statistics transformed into a mathematical discipline. Maths was largely missing in the initial stages.

The third and current stage has seen statistics become a computational discipline.

[1]Hand (2007), Information Generation: How Data Rule our World, Oneworld Publications

200 years
OF ASSET ALLOCATION

Pre-history 1590 - 1815

1590 First pension fund, Chatham Chest, set up to pay benefits to disabled seamen

1699 The Worshipful Company of Mercers offers first life assurance policy

1875 The North of Scotland Canadian Mortgage Company founded, laying foundations for Aberdeen Asset Management

1882 Reuters establishes first staff pension fund

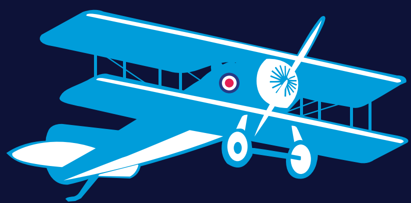
1890 80% of British life office assets invested in non-exchange traded assets, mostly mortgages

80%

1908 The state pension established

World War Years 1914 - 1945

1914 First World War breaks out



1928 The Place of Ordinary Shares and Stocks in the Investment of Life Assurance Funds published by Legal & General actuary

1979 Paul Volker becomes head of the US Federal Reserve, ushering in multi-decade era of disinflation

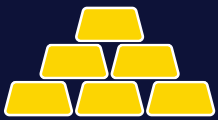
1991 Robert Maxwell goes missing from yacht after plundering company pension fund

2000 Equitable Life mismanages assets and liabilities, closes after House of Lords ruling on payouts

100%

2000 Boots pension fund shifts 100% of investments into government bonds

1717 Britain stumbles onto the gold standard

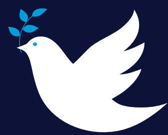


1743 The Church of Scotland establishes Scottish Ministers' Widows Fund

1762 Equitable Life Assurance Company founded, world's first mutual insurer, employing the first actuary

Pax Brittanica 1815 - 1914

1815 Defeat of Napoleon marks start of Pax Britannica, 100 years of relative peace, economic stability and falling interest rates

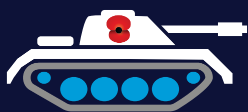


1825 The Life Insurance Company of Scotland founded, changing name to The Standard Life Assurance Company in 1832

1862 A.H. Bailey publishes influential paper arguing for minimised risk, but embracing illiquidity

1868 The Foreign & Colonial Government Trust created, the first investment trust

1937 G.H. Recknell, actuary at National Mutual, makes case for equity investing within with-profit books



1945 Second World War ends

Post-War Years 1945 - 2000

1947 George Ross Goobey joins Imperial Tobacco pension fund and sells out of government bonds

100%

1955 Ross Goobey persuades Imperial Tobacco to invest 100% of pension fund in equities

1957 Anderson & Binns paper argues for increasing equities (using theory of Constant Proportion Portfolio Insurance)

1973 Oil crisis triggers global recession, rise in inflation and bear market in equities and bonds

Part III

The post-war era

1969: Advertisement for Standard Life's unit endowment policy, offering the opportunity to 'participate in the risks and rewards of the equity market'.

Image reproduced courtesy of Standard Life Aberdeen Archive.

"High public debt often produces a drama of default and restructuring. But debt is also reduced through financial repression, a tax on bondholders and savers via negative or below-market real interest rates. After WWII, capital controls and regulatory restrictions created a captive audience for government debt."

Carmen Reinhart and Belen Sbrancia, The Liquidation of Government Debt, IMF Working Paper, January 2015

The post-war years played out in three acts for investors. In the first, interest rates were held at low levels even as inflationary pressures built. This allowed a gradual erosion of the government's debt burden. The more investors followed the example of Keynes and switched from bonds to equities, the better they performed. The second act started with the breakdown of the Bretton Woods system in 1971, followed shortly after by the OPEC embargo of 1973. Inflation soared and there were few safe havens for investors. The appointment of Paul Volcker as head of the US Federal Reserve in 1979 introduced the third act. Central banks regained control of inflation, marking the start of a long-term downward trend in interest rates. A combination of deregulation and globalisation opened up a world of new opportunities for institutional investors.

The rise and fall of institutional equity investing

In 1945, equity investing was an activity of the adventurous few. By the 1970s, equities provided the backbone of institutional investment strategies. Thirty years later, the twin forces of falling interest rates and aging populations made the provision of defined benefit pension funds prohibitively expensive. The closure of a number of pension funds meant the shift from bonds to equities went into reverse.

Life offices

The actuarial position towards equity investing changed significantly in 1957. Two Edinburgh actuaries at Scottish Widows, J.L. Anderson and J.D. Binns, published a paper outlining a significantly more adventurous line of thinking on a life office's equity allocation.

Their paper noted that the traditional Recknell actuarial matching approach would mean that the life office would never be in danger of failing to meet its policyholder obligations as a result of equity asset performance, even if equity values fell all the way to zero. They argued that it was reasonable to assume some maximum level of depreciation that was less than this complete wipe-out. A prudently depreciated value should be allowed for when setting the office's maximum permitted allocation. They argued that a 60% fall in equities would be a reasonable assumption. This assumption boosted the maximum equity allocation by some two thirds above that implied by Recknell's matching approach[8]. Their methodology is still relevant today and is now known as Constant Proportion Portfolio Insurance.

Life offices' equity allocations continued to trend upwards in the following years. Between 1950 and 1976, the proportion of life office assets invested in equities and real estate roughly doubled to 50% of total assets. Towards the end of the 20th century, equities had become the dominant asset class for British life offices. By the mid-1990s, however, 15 years of falling long-term interest rates had taken its toll on liabilities. Life assurers' long-term guarantees, particularly in the form of Guaranteed Annuity Options, had become increasingly valuable to policyholders. The related demise of Equitable Life prompted significant regulatory changes. It triggered an industry-wide interest rate hedging programme, which proved to be timely in hindsight. The increasing cost of provision of long-term guarantees in traditional with-profit policies was unsustainable in the low interest rate environment. This was a major driver of the transformation of UK life assurers from underwriters of long-term financial guarantees to investment product providers. Equity allocations in with-profit funds - now largely in run-off - peaked in the late 1990s and are more modest today.

Pension funds

Pension provision continued to grow in the post-war period and by 1970 more than half of the entire British workforce was covered by defined benefit pension schemes. While the economics of pension funds were thrown into turmoil by the consequences of the First World War, it was not until after the Second World War that pension funds discovered a significant appetite for innovation in investment strategy.

As for life offices, it was the period of the late 1950s and early 1960s that saw pension actuaries develop a framework that embraced equities as a core asset class to back long-term liabilities. In particular, two papers published in 1961 and 1963 in the Journal of the Institute of Actuaries developed the idea that pension funds could reduce the actuarial valuation of liabilities by investing in equities. The innovation that changed the calculation was incorporating the expected return on equities into the liability discount rate[9].The lower liability valuation provided a rationale for an immediate reduction in the regular employer contribution rate, making equity investing a compelling proposition for pension fund sponsors.

By this time, however, pension funds had already invested significant proportions of their assets in equities. Between 1945 and 1954, UK pension funds' average equity allocation increased from 10% to 30%, and by the early 1960s it had risen to around 50%. This suggests the move towards equity investing by pension funds was not driven by developments in actuarial methodology.

Rather, the chronology suggests theory followed practice, with the changes in methodology happening after the changes in pension fund investment strategy. Nonetheless, the greater volatility of inflation during the war years and into the early 1950s created an actuarial appreciation of the real asset characteristics of equities in contrast to long-term gilts.

This actuarial rationale was formally presented in a 1957 paper[10], which argued that the real nature of long-term dividend growth provided a natural cashflow match for salary-linked benefits. This made equities a lower risk asset for an open pension fund than long bonds. As McKelvey, the actuarial author put it, "The question now is not, as it used to be, dare we put more than 10% in equities? It is, dare we leave more than 50% in fixed income investments?"

It is impossible to tell the history of British pension fund equity investing without mentioning the influential figure of George Ross Goobey[11]. An actuary by training but an investment manager by choice, Ross Goobey transformed pension fund investing after 1947 when he joined the Imperial Tobacco pension fund. In particular, he made three bold asset allocation moves.

His first act was to sell out of government bonds, then yielding less than the rate of inflation. This proved astute as inflation continued to gain pace for the next 30 years.

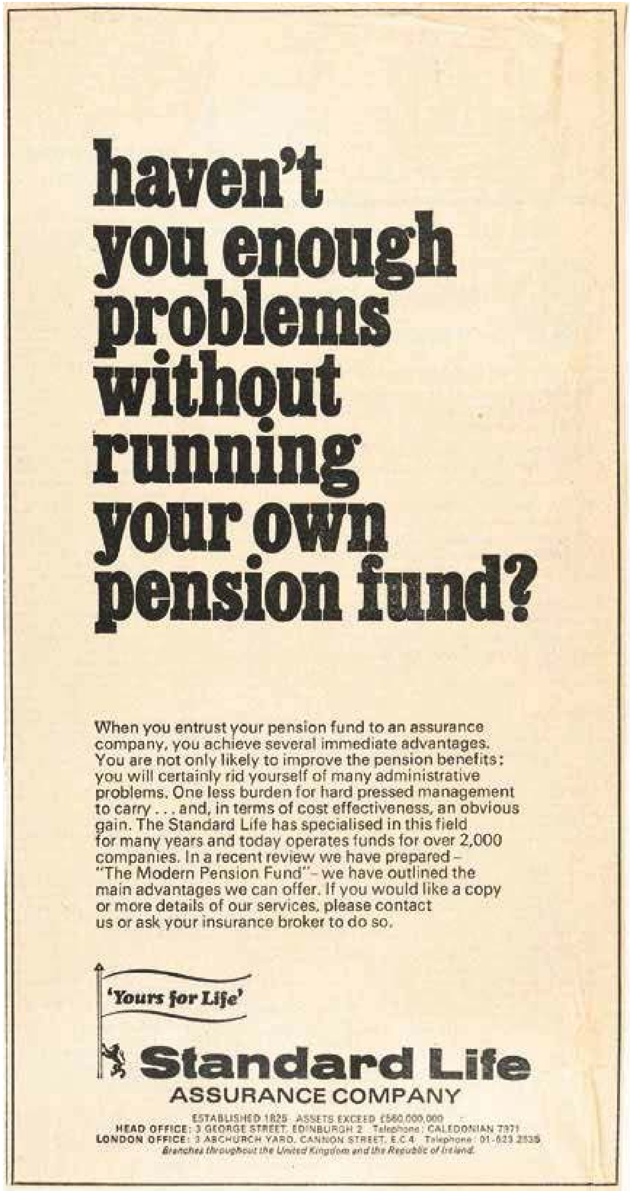
8 The Anderson & Binns formula for maximum permitted equity allocation is (Total Market Value of Assets – Cost of Guarantee Matching Portfolio) / k, where k is the assumed maximum equity depreciation. Note the Recknell approach implies k =1. Those with an interest in option pricing may notice that this formula is now known as Constant Proportional

Portfolio Insurance. Whilst Anderson & Binns did not have continuous re-balancing or arbitrage-free pricing in mind, their logic could be viewed as an early precursor of the theory of dynamic replication of a put option.

9 Heywood and Lander (1961) and Day and McKelvey (1963)

10 McKelvey (1957)

11 Ellis (1988 and 1991). For a fuller discussion of George Ross Goobey's influence on British pension fund investing, see Morecroft (2017).



1967: A Standard Life advertisement extolling the virtues of insured pension schemes over managed ones.

Image reproduced courtesy of Standard Life Aberdeen Archive.

Second, in 1955 he persuaded the pension fund to invest 100% of its assets in equities. (Ironically, this was just three years after Nobel Prize winner Harry Markowitz's paper[12] on the benefits of diversification.) He saw the appeal of investing in dividend paying equities, with the scope for those dividends to grow in line with inflation, at a time when equities yielded more than bonds. Many other British pension funds would follow this lead over the coming years.

Third, in a speech to the National Association of Pension Funds in 1971, he made the case for investing in property. By now, his views on equities had become the consensus. Indeed, in his speech he referred to 'the cult of the equity'. The yield gap that first attracted him to equities had become a reverse yield gap of 5%, a level beyond a realistic expectation for the future growth in dividends. Property offered more attractive valuations, together with inflation-linked rents. However, in contrast to the first two shifts, this was not an instant success. Property suffered significant falls in value during the deep recession of 1973-75, as did equities and government bonds.

The actuarial arguments in favour of equity investment for pension funds that emerged in the 1950s and 1960s were driven by two fundamental beliefs. First, asset and liability cashflows should be matched. And second, both salary-related pension liability cashflows and dividends are linked to inflation, making equities a good match and natural asset class for open pension funds. With actuarial orthodoxy now aligned with Ross Goobey's thinking, pension fund equity allocations continued to follow their upward trend. By 1975 two-thirds of UK pension fund assets were invested in equities and property[13].

However, not all actuaries agreed that the primary rationale for advance funding of pension liabilities was to invest in assets that match the cashflows of long-term liabilities. Instead, they saw the primary role as ensuring that accrued pension benefits could be secured in the event of (possibly short-term) sponsor insolvency. This could be achieved by transferring these liabilities to a third party — almost certainly a life office. This perspective implied an asset strategy that was more defensive. In particular, one of the portfolio's objectives should be to avoid performing badly in the economic conditions associated with (near-term) sponsor insolvency. This view never dominated British actuarial thinking on pension fund investment strategy, but did have increasing influence during the final quarter of the twentieth century.

The recession of the early 1990s and the fall of long-term rates from their peak of the early 1980s encouraged greater weight to be placed on this funding-for-security argument. Moreover, the equity experience of the 1970s and 1980s undermined the actuarial premise that real equity dividend growth could be assumed to be stable over the long-term. UK dividend pay-outs fell by around 45% in real terms between 1970 and 1974 and did not fully recover their real 1970 value until the late 1980s[14].

The Robert Maxwell scandal led to security concerns of a very different nature. In 1991, the flamboyant proprietor of the Mirror Group went missing from his yacht and his body was found floating in the Atlantic Ocean. It was later discovered that he had plundered the company pension fund in an unsuccessful attempt to ward off corporate bankruptcy. This episode helped shape the 1995 Pensions Bill and enabled members to elect at least a third of the pension scheme's trustees.

A further disincentive to hold domestic equities was delivered in 1997 when taxation of equity dividends was introduced for previously tax-exempt investors, principally pension funds. While this change did not fundamentally alter the calculus of pension fund asset allocation, at the margin it added impetus to the rotation from equities to fixed income assets.

Defined benefit pension liabilities, inflation-linked and very long-term, are a form of financial promise that is particularly exposed to the current environment. These pension schemes were designed to work with a long-term real investment return of 3%-6%. The contribution rates required to fund the traditional level of final salary pension promise when long real rates are zero or negative are untenably large. Indeed, the aggregate deficit of over 5,000 schemes in the Pension Protection Fund's universe was over £700 billion in 2017 (on a buy-out basis).

This has led to the widespread closure of UK defined benefit pension funds over the last 20 years. As pension funds close and move into run-off, their appetite for equities inevitably diminishes. Aggregate UK defined benefit pension fund equity allocations have been in steady decline since the 1990s. As of 2000, in aggregate 70% was invested in equities by UK pension funds, having peaked in 1993 at 80%. By 2014, this figure was just 44%. Where Ross Goobey once set the trend by following a strategy of 100% exposure to equities, Boots pension fund proved to be the poster child for the 21st century. In 2001, it shifted 100% of its investments into long-dated AAA sterling fixed and inflation-linked bonds[15].

[12] Markowitz (1952), Portfolio Selection.
[13] Holbrook (1977)
[14] Dimson, Marsh and Staunton (2002), p. 152.
[15] Ralfe (2004), Pensions and Capital Structure: Why hold equities in the pension fund?

Part IV

Looking forward

Baby Matthew, part of the 1984 'Standard Life for all of your life' advertising campaign.

Image reproduced courtesy of Standard Life Aberdeen Archive.

Three forces are reshaping long-term investment institutions: a low-return world, the modernisation of regulatory regimes and financial innovation.

The sustained fall in long-term interest rates from the early 1980s to today has created profound challenges for savers – and the institutions that serve them. It is harder for individuals to generate the returns needed to sustain their lifestyles in retirement.

The modernisation of regulation is exposing the true risks of any mismatch in assets and liabilities for insurance and pension providers. These risks are increasingly being passed back to their customers to manage. We are seeing the democratisation of financial risk, bringing increased choice to individuals, but placing the burden of responsibility for their financial futures in their own hands.

Advances in computer science are driving financial innovation and increasing the investment options available. This is evident in both the growing range of investment products and the increased scope to combine these products into bespoke solutions that meet investors' needs. In the right hands, these options allow for a more tailored solution. But increasing the options available to end-consumers does not guarantee a better outcome and can lead to confusion.

What do these changes mean for best practice investing in the 21st century? Are there still lessons that can be learned from the pioneers of the last 200 years: Bailey, Anderson, Binns, Keynes and Ross Goobey?

Asset allocation to manage risk – back to the future

The actuaries of our story would be delighted by the arrival of inflation-protected government bonds in 1981 – until they discovered that today they were being offered a guaranteed loss of 1% per annum in real terms for the next 50 years. This is reflective of the environment that has generated large pension fund deficits, with a dearth of obvious investment solutions. An actuarial focus on risk aversion rather than return generation will remain the dominant strategy for insurers and pension providers. As more defined benefit pension funds close, the shift from equities to fixed income – underway for some 20 years – seems unlikely to reverse.

UK life offices have fully embraced the lessons of Bailey. A major rotation from public to private credit is underway. At the same time, balance sheets today probably take on more credit risk than at any time in history. The investment strategy of annuity books today, with their corporate-bond-dominated asset portfolios, would be familiar to 19th century investors. These are portfolios of secure, high-quality assets, generally managed on a buy-and-hold basis.

Where UK institutions have led in adopting liability-driven investment strategies, US institutions are catching up. Here too, accounting regulation is driving the change.

Asset allocation to generate returns – today's pioneers

The pioneering investors of the past were willing to follow a very different strategy from the consensus, investing in novel asset classes. For Bailey, this was mortgages; for Robert Fleming, US railroad debt; and for Keynes and Ross Goobey it meant equities.

For today's investors, the asset classes of the world – major and minor – have been mapped out. There is a daunting menu of funds offering access to liquid markets, from frontier equities to every corner of the bond market. We see two paths for the pioneers of today: investing in private markets and embracing innovation.

Private markets provide the scope for investment experts to add value, due to the challenges of sourcing information, accessing investment opportunities and managing liquidity. Our Asia Pacific Insurance Survey highlighted a desire by insurers to increase exposure to private equity, real estate and infrastructure. It also identified the barriers to achieving this aim, both real and perceived.

The falling costs and rising power of computer technology allows investors to develop innovative investment solutions. Systematic quantitative methodologies can offer targeted exposures to risk premiums at lower cost than traditional active approaches. Investors can model cashflow at the level of individual investments to more accurately match assets and liabilities. This more granular approach can be used to deliver genuine diversification.

Reshaping long-term investment institutions

The modernisation of solvency and accounting regulations is not just increasing the transparency of underlying risks, it is also increasing the costs of supervising these risks. More demanding reporting standards require not only the systems to deliver these reports but the people to understand, interpret and act on their findings, irrespective of how much risk is taken. Rising costs and increasing competition is leading to industry consolidation.

Over the last few decades, life offices have written less and less business that involves exposing the provider to unhedged equity risk. With-profits business, the traditional vehicle of the British life office, has all but ceased to be written. The defined benefit pension fund is increasingly being replaced by defined contribution. And across the world, guaranteed return products are being replaced by products whose pay-outs are dependent on investment returns.

But long-term liabilities have not disappeared. Instead, they have been transferred to new asset managers. On one side are a few large state-owned asset managers: sovereign wealth funds and local government pension funds. And on the other are individual savers. These individuals now directly bear the long-term investment risks of funding their retirement.

The large, state-owned asset managers are certainly among the pioneers of today. The study of factor investing by the Norwegian Sovereign Wealth Fund acted as a catalyst for the growth in smart beta investing that we see today. The investment policy of Canadian Pension Plan Investment Board and its local peers has provided a role model for similar schemes in Australia, the UK and beyond, embracing private markets and taking more of their asset management in-house.

The changing solvency and accounting regimes provide additional challenges for the investors of insurance assets. They must consider the impact of their investment decisions on solvency ratios and profit & loss accounts, alongside investment risk and return considerations. This requires closer collaboration between investment and actuarial teams.

Handing the investment menu to individual savers

For individual savers, these changes mean the investment menu is increasingly being left in their hands. This creates new challenges not only for savers, but also for their insurance and pension providers.

The role of UK life assurance companies has evolved from underwriting long-term guaranteed financial products to primarily providing a platform for distributing third-party investment solutions, both to the fast-growing defined contribution market and directly to end-consumers. The provision of investment advice is sometimes tied to this distribution, sometimes not.

Pension providers need to think carefully when designing default investment strategies, budgeting not only for investment risk but also for investor behaviour. This means that multi-asset solutions that are designed around the desired outcomes of investors will continue to grow. The end of annuitisation means the full range of solutions must cater for both before and after retirement.

Communicating with retail investors also requires different skills. A decade of benign investment markets has provided investors with relevant lessons on the rewards of investing, but not necessarily equipped them to cope with the risks. The successful insurers and pension providers of the future will have learnt the investment lessons of the pioneers of the last two centuries. But they will also be able to translate the language of actuaries and investors into plain English for their end customers. No mean feat!

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