The Actuarial Profession

making financial sense of the future

Momentum Conference 2012

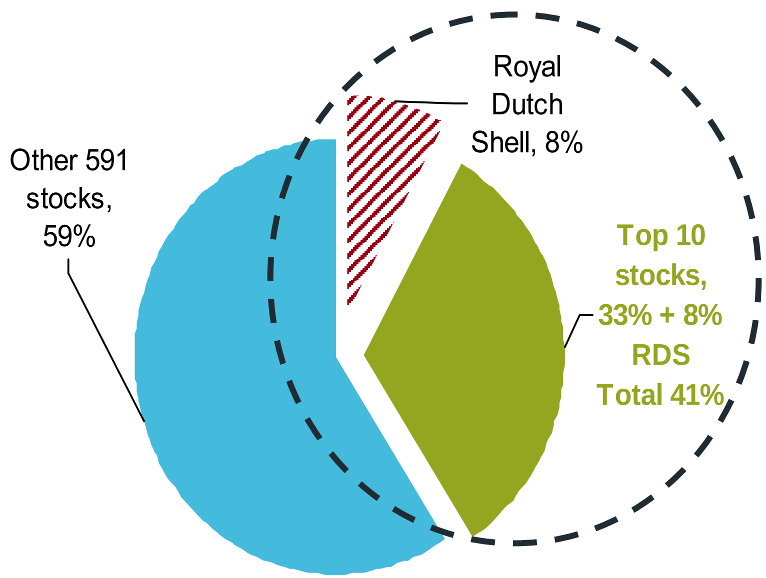
Marcus Mollan, Head of Solutions Research, Legal & General Investment Management

Diversified Investment Strategies

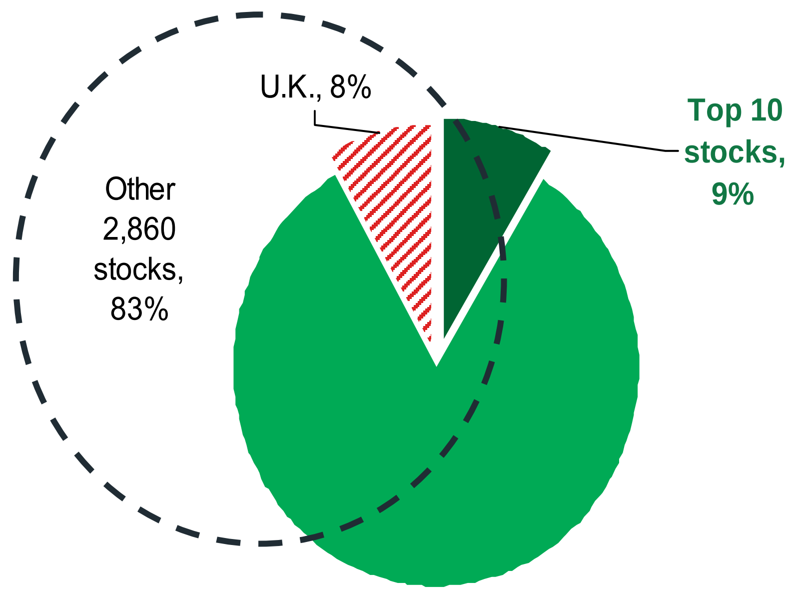
DIVERSIFICATION: BASICS

Diversification within equities

UK Equities (FTSE All-Share Index)



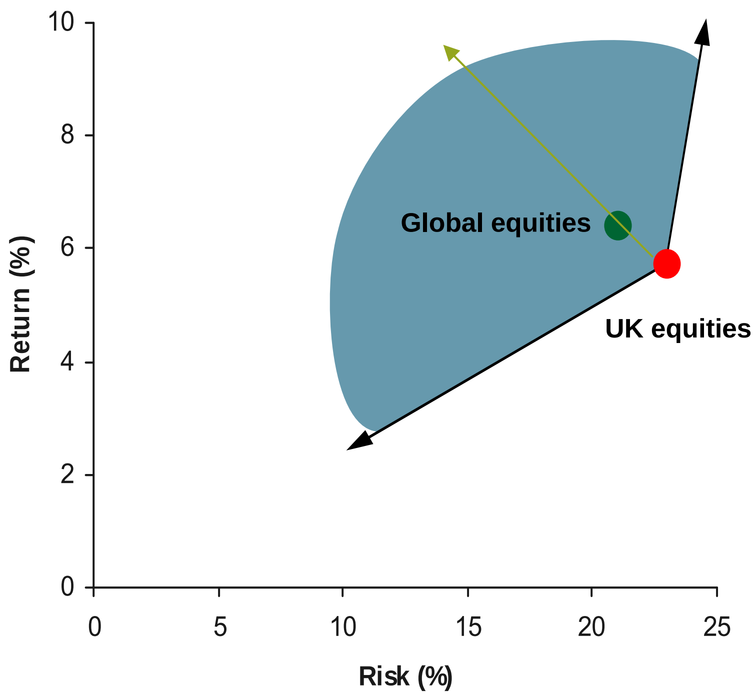
Global Equities (FTSE AW-World Index)



Source: FTSE.

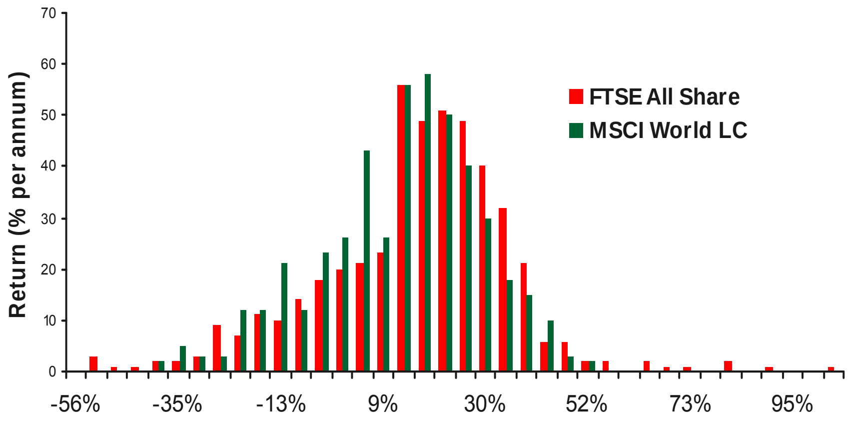
How diversification works within equity

Risk/return profile of a portfolio fully invested in Equity



Source: LGIM.

Volatility profile of UK Equity market vs. Global Equity market

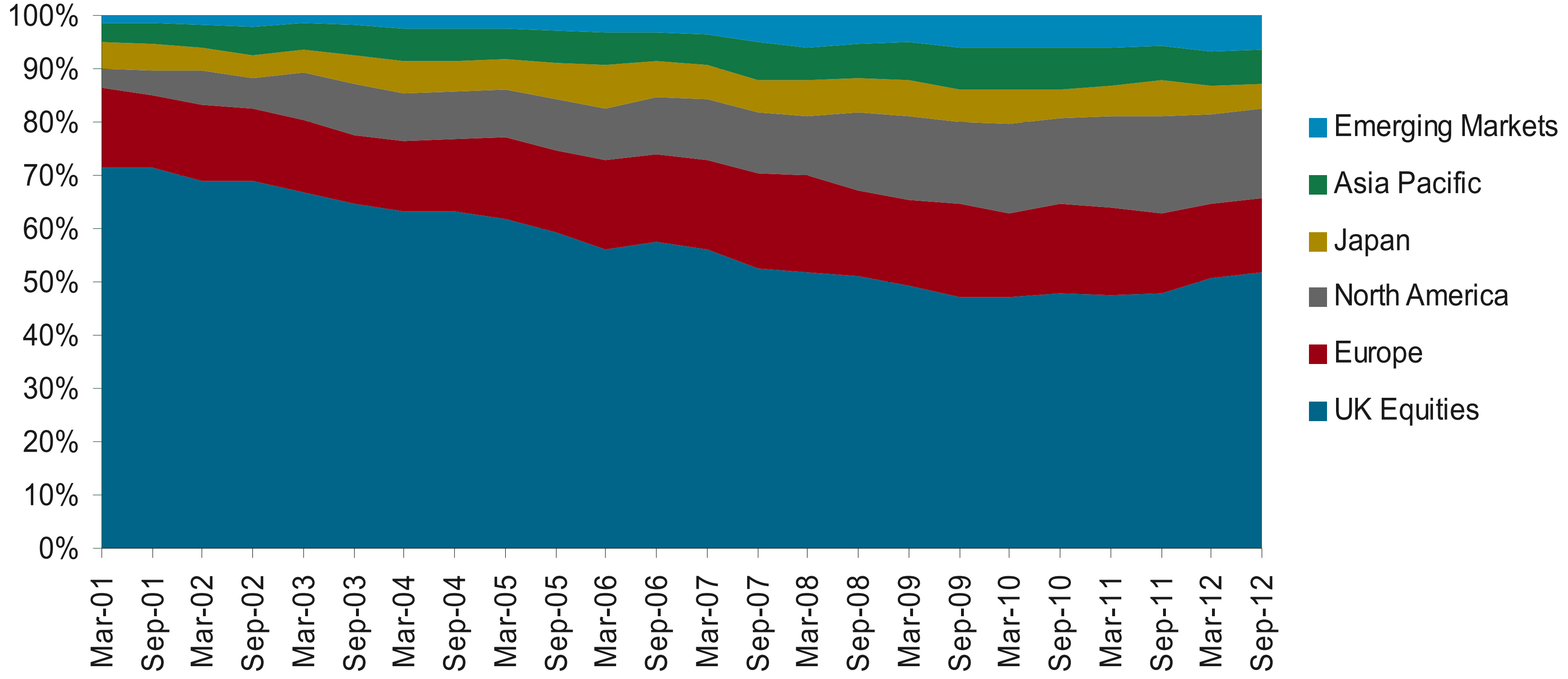


Loss over 12 months (rolling)	UK Equity	Global Equity
More than 40%	5	0
More than 25%	21	13

Source: LGIM, number of instances over last 40 years of data.

UK DB pension schemes have diversified

…but far to go

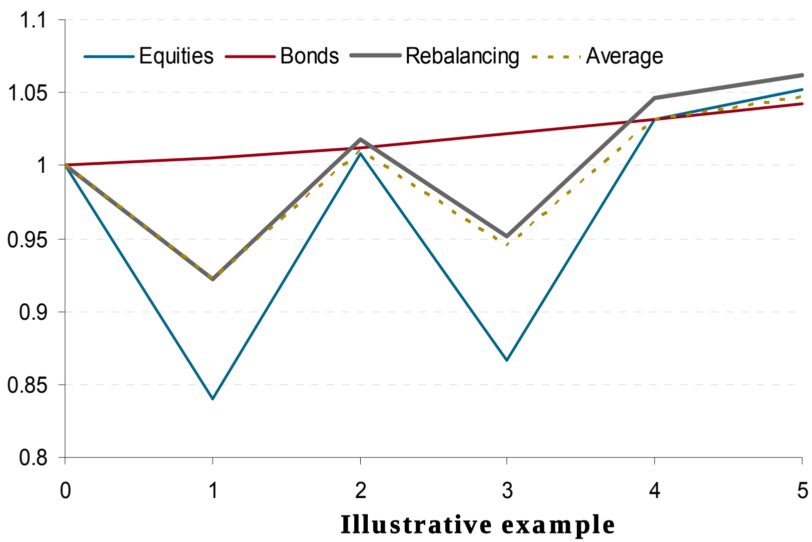


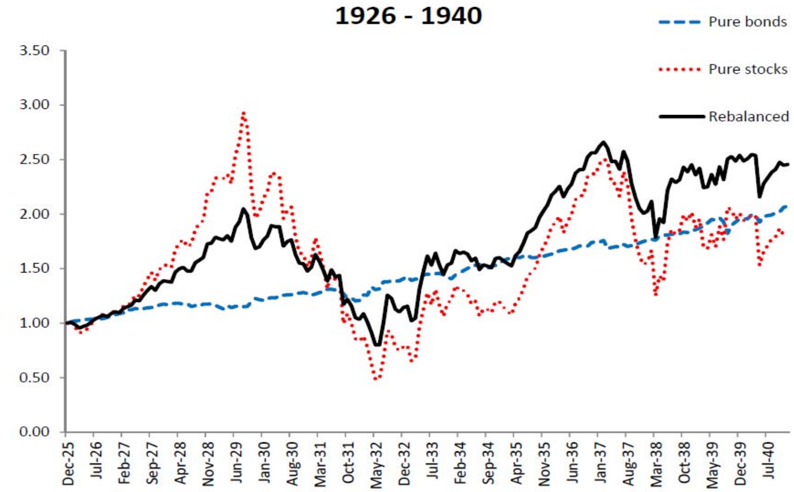
Source: CAPS

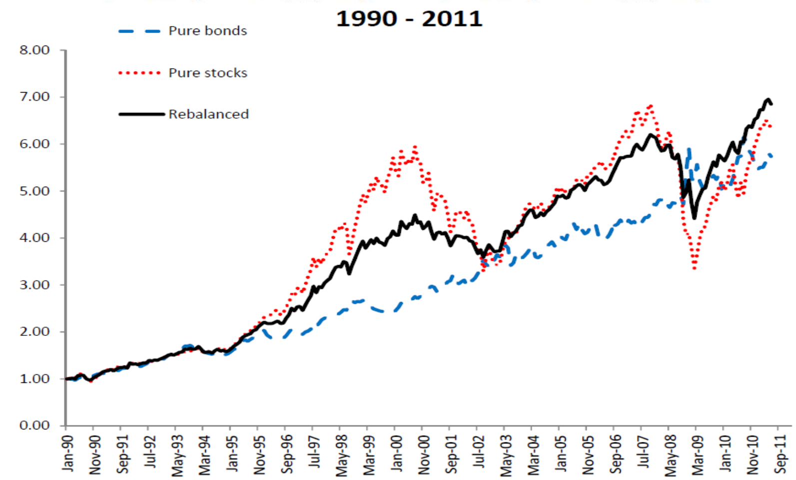
Portfolio rebalancing

Harvesting a diversification/rebalancing return

- Benefits of rebalancing can be seen with a bond/equity portfolio
  - “Bank” returns if equity markets rally and re-risk in a trough
- Rebalancing is even more effective for a diversified portfolio with multiple return drivers

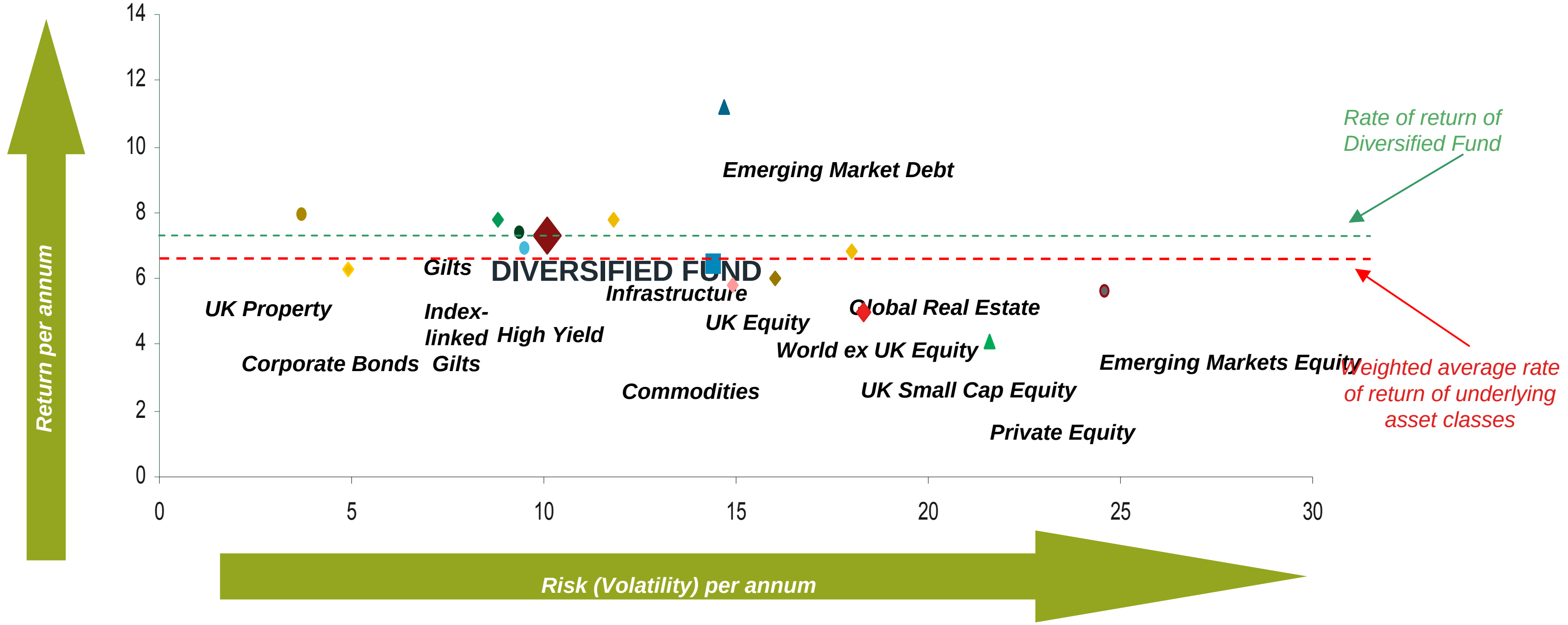






Source: Andrew Ang/Columbia University

The Diversification Bonus: historic impact

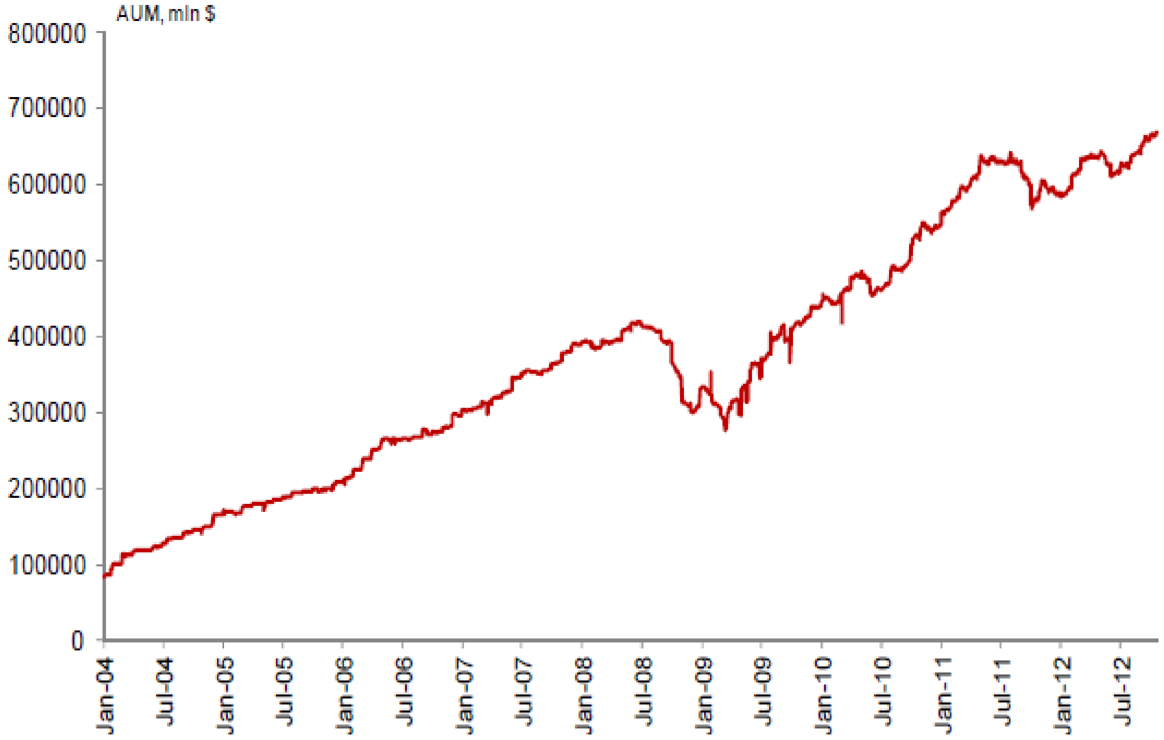


- Keeping a diversified allocation, regularly rebalanced the neutral weights, gave a boost to the rate of return of 0.7% pa, over and above the weighted average of the underlying asset classes.
- This is an practical example of the "Diversification Bonus" (Bernstein & Wilkinson, 1997)
- The Diversification Bonus can allow risk reduction with limited impact on the expected rate of return
- The Diversification Bonus does not require or assume mean reversion; for a properly-diversified multi-asset portfolio its value is estimated at about 0.6%-0.7% per annum (gross of fees)

Risk based on annualised standard deviation of monthly returns, 1994-2011. Simulated performance of Diversified Fund, assumes monthly rebalancing. Source: LGIM. Raw data from UBS Delta, Bloomberg L.P., Barclays Capital Live

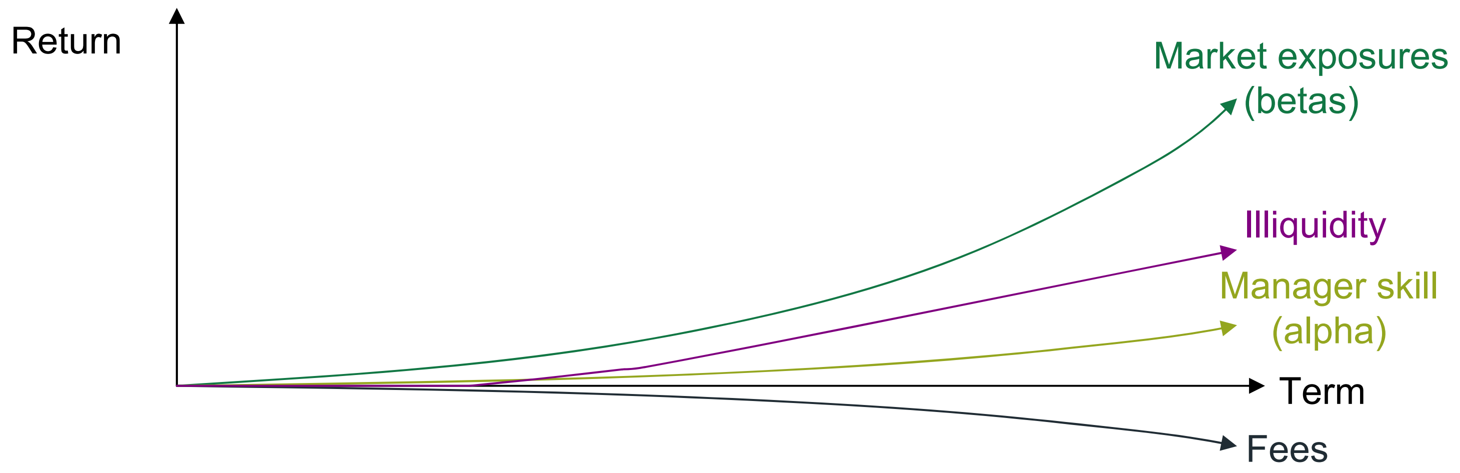
DIVERSIFIED GROWTH FUNDS

The growth of Diversified Growth Funds



Source: Bloomberg, Nomura Strategy research

Some sources of return for an investor

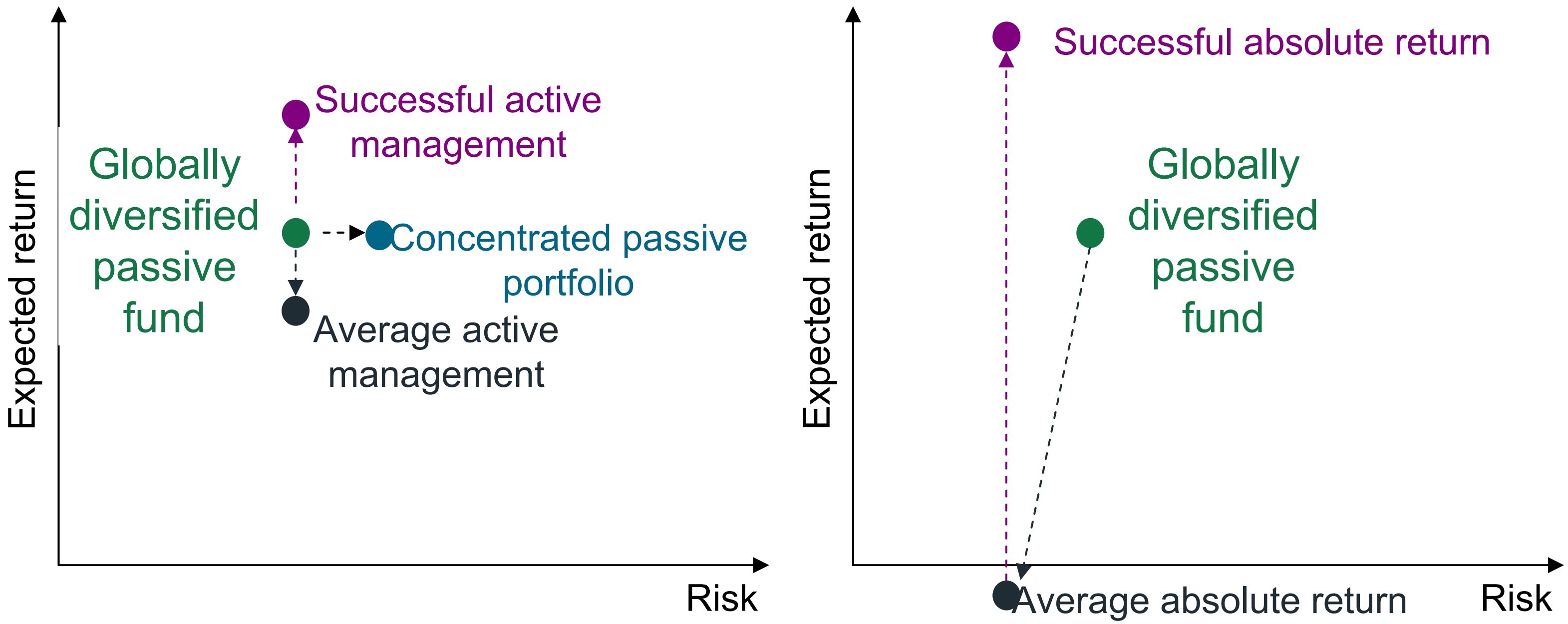


- Risk associated with each return source, except fees which are a certain drag
- Investment term impacts sensitivity to risks → market and illiquidity risk generally fall with longer horizon
- Active management is a negative sum game, but it is very likely that some managers will out-perform

Source: LGIM, picture is for illustrative purposes only.

The rightful return for passive investment…

…is the risk-adjusted, post-fee expected return for a globally diversified portfolio



A passive diversified fund is an objective starting point, from which to measure reduced diversification or active management

Source: LGIM, picture is for illustrative purposes only.

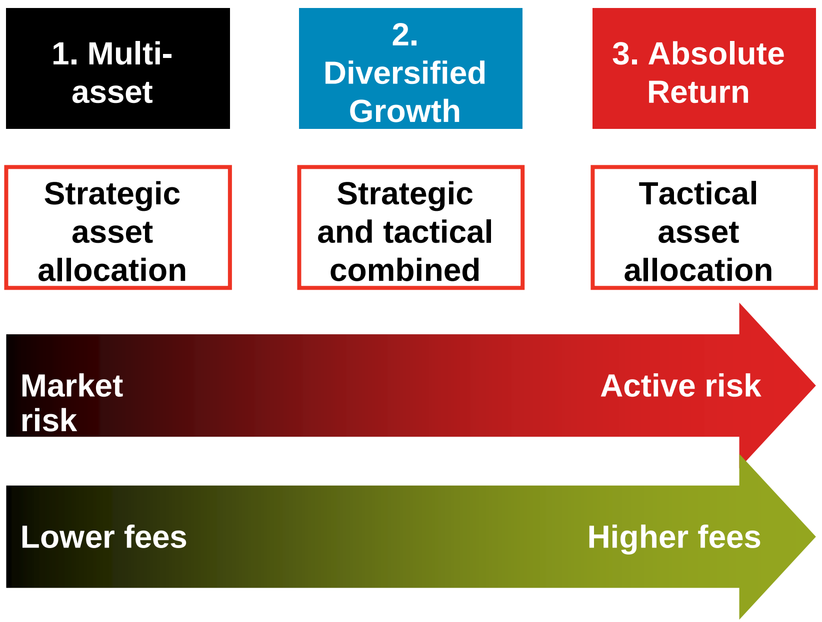
Diversified Growth Funds – a personal opinion

Diversified Growth Funds used by pension schemes should, in our opinion, be:

- Diversified
- Designed for pension schemes

These features are, perhaps surprisingly, often lacking in funds marketed as "Diversified Growth Funds" for pension schemes!

Types of “Diversified Growth Fund”

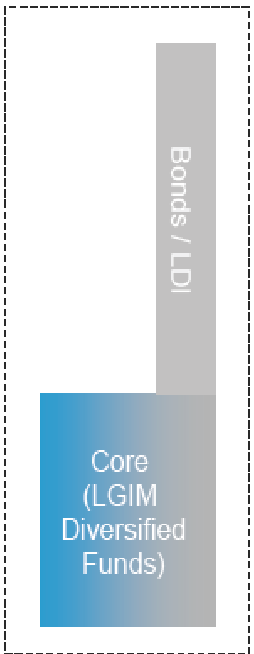


Source: LGIM, picture is for illustrative purposes only.

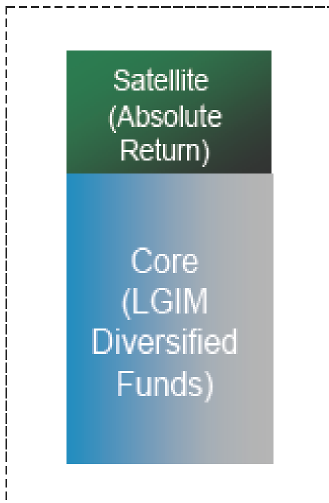
1. **Multi-Asset Funds**
   - focus on market exposure with strategic asset allocation driving risk and return
   - minimal tactical asset allocation
2. **Diversified Growth Funds**
   - target a cash-plus or inflation-plus objective across a full market cycle.
   - returns and risks depend both on market returns and on the active management skills of the manager
3. **Absolute Return Funds**
   - aim to deliver returns across all market environments (usually “cash +”)
   - rely on the ability of the fund managers to access return from market inefficiencies
   - may make extensive use of derivatives

Diversified Growth Funds – suggested usage

- A single fund (typically for DC growth default), or
- Within a multi-fund structure – for example:

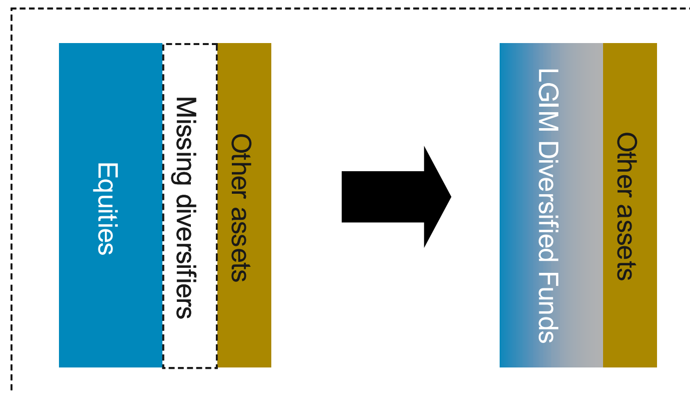


A) Alongside LDI Funds for DB



B) The Core in a Core/Satellite diversified structure

(Better diversification than “equities plus absolute return”)

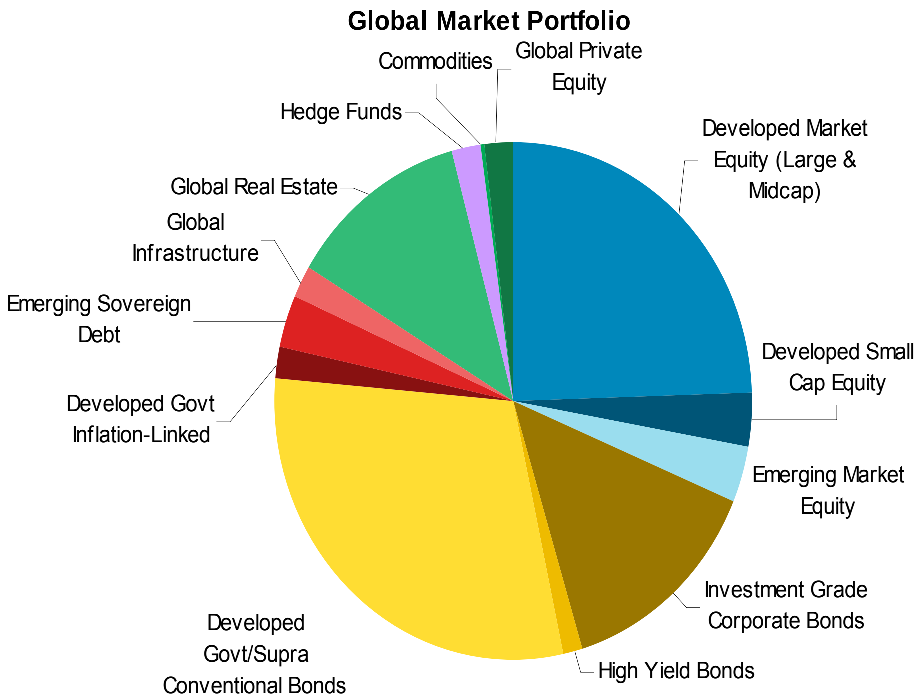


C) As a developed equity substitute within any structure

(Better diversification)

Source: LGIM, picture is for illustrative purposes only.

Beta: Building a Diversified Return-Seeking Strategy



- A point of reference should be the market portfolio across all asset classes, with market weightings
- This portfolio will approximate the best risk/return trade-off *for the typical/marginal investor*
- But:
  - A) our client may not be the typical investor, and may have different characteristics
  - B) the market portfolio may have inappropriate biases, mispricings or risk concentrations

Source: LGIM, JP Morgan, Barclays, FTSE, DTZ, Bloomberg L.P.

Incorporating requirements of a UK pension scheme

- Time-frame? (relatively) long-term
- Nominal or real liabilities? mostly real (usually)
- Currency of liabilities? GBP

- These factors should influence the design of the fund in terms of:
  - Term of the assets
  - Tolerance for illiquidity risk
  - Exposure to nominal vs inflation-linked assets
  - Currency exposure/hedging

- The global market portfolio is useful, but only a start. Should apply a formal Strategic Asset Allocation process to achieve a portfolio tilted in the right directions for a UK pension scheme

Correlations 1994 - 2012

	UK Equity All Cap	UK Equity Small Cap	World ex UK Equity	Emerging Market Equity	Corporate Bonds	High Yield Bonds	Gilts	I-L Gilts	Emerging Market Debt	Global Real Estate	Commodity
UK Equity All Cap	1.00										
UK Equity Small Cap	0.81	1.00									
World ex UK Equity	0.87	0.71	1.00								
Emerging Market Equity	0.73	0.70	0.79	1.00							
Corporate Bonds	0.19	0.14	0.14	0.08	1.00						
High Yield Bonds	0.60	0.64	0.57	0.65	0.29	1.00					
Gilts	0.02	-0.05	0.03	-0.02	0.73	0.01	1.00				
I-L Gilts	0.18	0.12	0.19	0.15	0.49	0.22	0.59	1.00			
Emerging Market Debt	0.50	0.44	0.63	0.70	0.23	0.57	0.18	0.20	1.00		
Global Real Estate	0.72	0.67	0.76	0.73	0.24	0.63	0.07	0.25	0.63	1.00	
Commodities	0.33	0.35	0.37	0.42	0.01	0.26	-0.05	0.09	0.35	0.36	1.00

Key:	< 0	>0 to 0.5	0.5 to 0.9	0.9 to 1

Source: LGIM. Raw data from UBS Delta, Bloomberg L.P., Barclays Capital Live. For the purpose of this presentation, correlations are used as in indicative measure of risk. However, please note that correlations are not a stable measure over time.

Correlations rise in periods of stress

Financial crisis - April 2007/April 2009

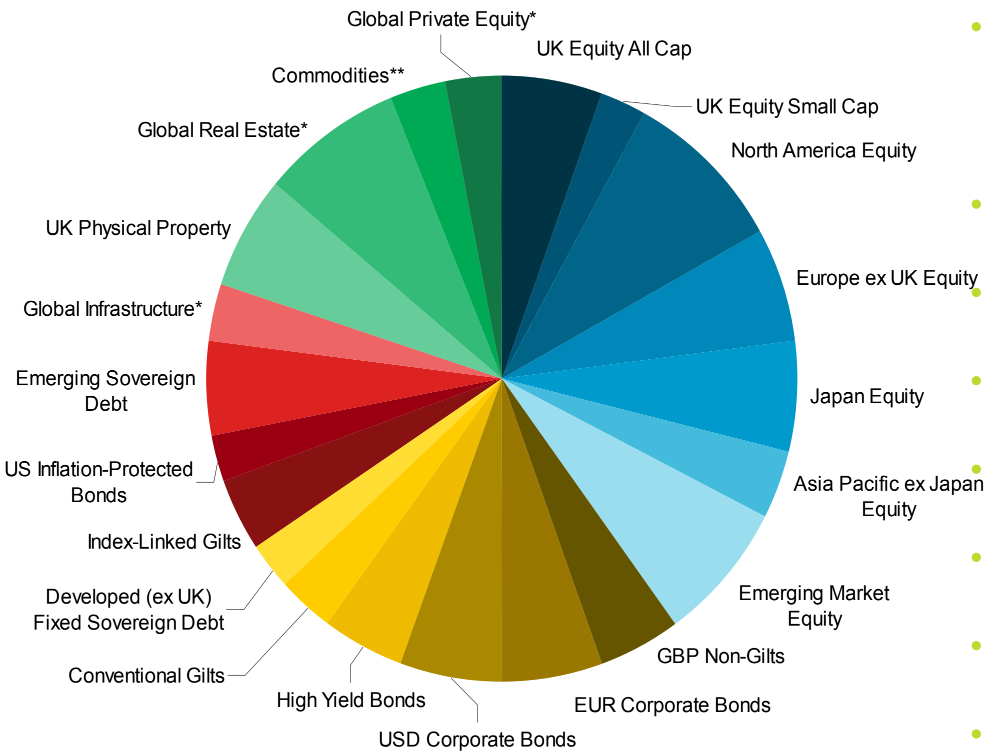
- Portfolio construction must distinguish between a) headline correlations and b) asset class relationships in stressed markets and tail events

	UK Equity All Cap	UK Equity Small Cap	World ex UK Equity	Emerging Market Equity	Corporate Bonds	High Yield Bonds	Gilts	I-L Gilts	Emerging Market Debt	Global Real Estate	Commodity
UK Equity All Cap	1.00										
UK Equity Small Cap	0.90	1.00									
World ex UK Equity	0.91	0.78	1.00								
Emerging Market Equity	0.89	0.90	0.86	1.00							
Corporate Bonds	0.58	0.46	0.59	0.49	1.00						
High Yield Bonds	0.64	0.76	0.55	0.65	0.30	1.00					
Gilts	0.26	0.17	0.46	0.33	0.72	-0.12	1.00				
I-L Gilts	0.56	0.51	0.68	0.56	0.64	0.50	0.55	1.00			
Emerging Market Debt	0.59	0.53	0.78	0.65	0.72	0.37	0.70	0.69	1.00		
Global Real Estate	0.77	0.72	0.90	0.76	0.53	0.63	0.41	0.70	0.79	1.00	
Commodities	0.50	0.58	0.40	0.56	0.27	0.44	0.10	0.47	0.31	0.36	1.00

Key:	< 0	>0 to 0.5	0.5 to 0.9	0.9 to 1

Source: LGIM. Raw data from UBS Delta, Bloomberg L.P., Barclays Capital Live.

What might a well-diversified portfolio look like?

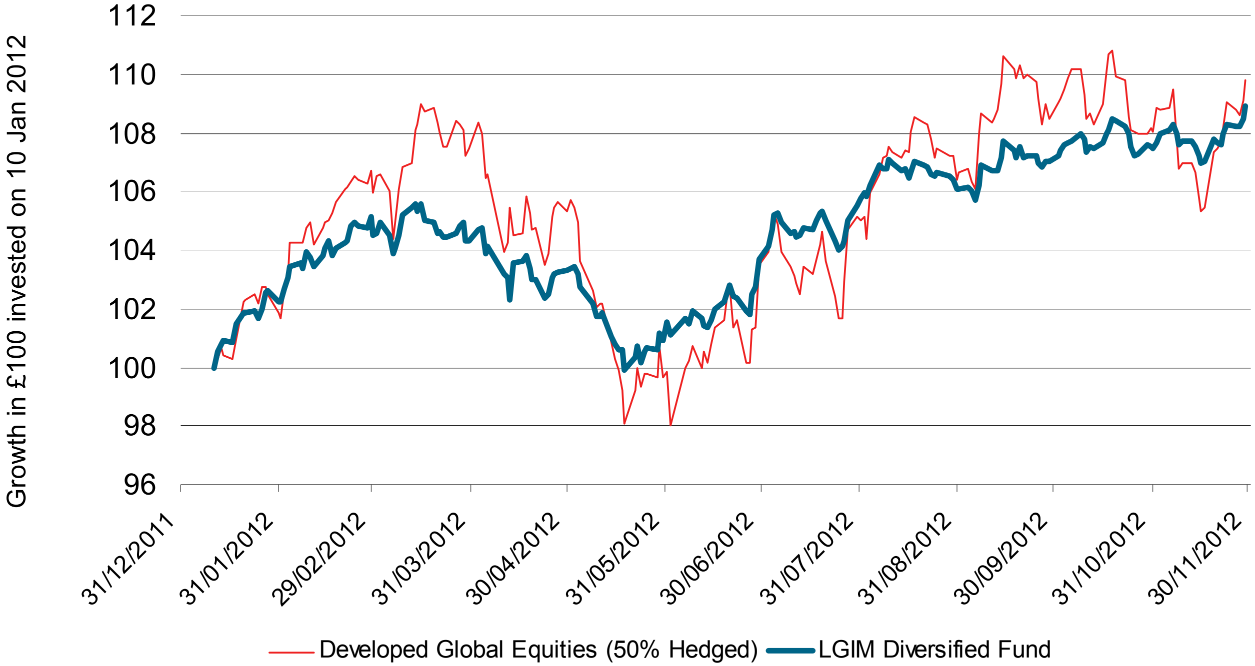


- Expected rate of return similar to developed global equities (cash + 3.5%) over the long term
- Target ~2/3 of equity risk over the long term
- 21 underlying asset classes
- Over 4,500 holdings
- Top 30 equity holdings are only 8% of fund
- Passive underlying funds (at least 85%)
- Low turnover, trading costs, fees and TER
- Transparent, with over 95% in physical assets

* Exposure via through shares in listed infrastructure and private equity companies and global Real Estate Investment Trusts (REITs).
** Exposure through investing in funds that aim to provide a similar return to selected commodity indices. The underlying funds invest in derivatives to provide the return of the specified indices.

Source: LGIM, picture is for illustrative purposes only.

Diversified Portfolio: Performance

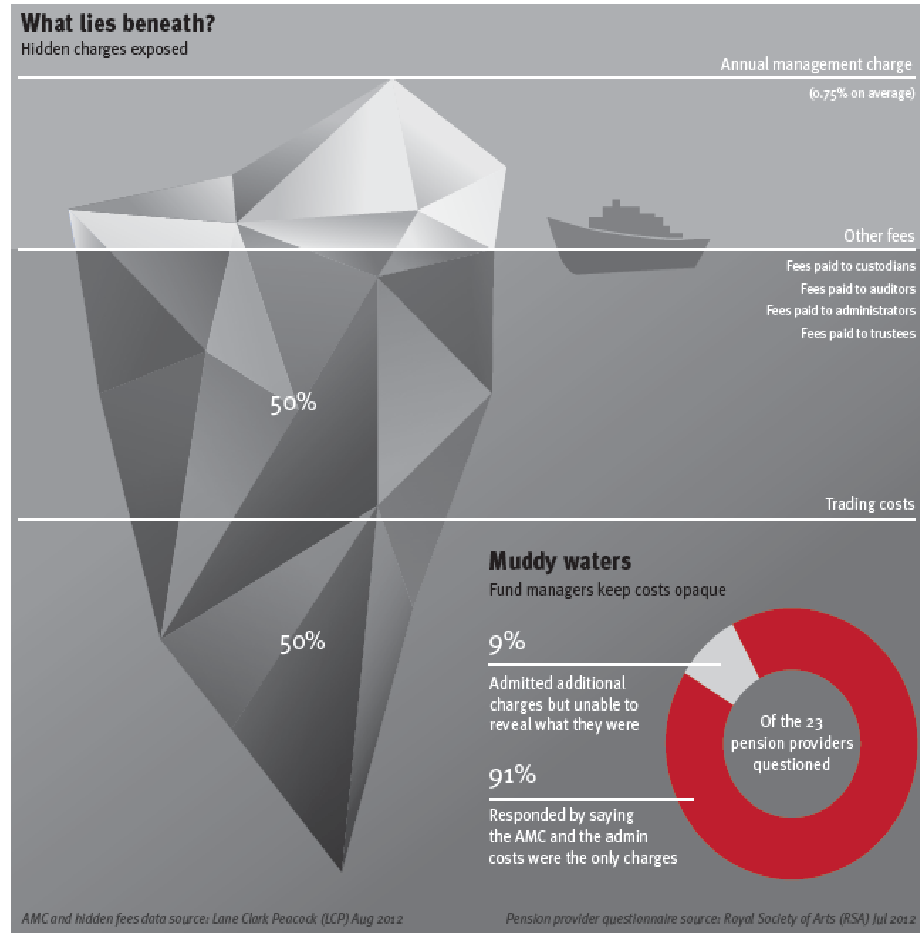


- Returns (10/01/12 – 29/11/12): Diversified Fund 8.9%
- Annualised volatility: Diversified Fund: 6.0% pa, Developed Global Equities (50% hedged): 11.9% pa
- LGIM Diversified Fund has exhibited 50.4% of equity volatility since launch

Source: LGIM. Benchmark shown is 50% FTSE All World Developed Index, 50% FTSE All World Developed Index (hedged to GBP). Volatility figures are based on annualised volatility of 5-day returns. Past performance is not a guide to future performance.

Fees in the Diversified Growth Fund universe

+ **Annual management charge**
+ **Other costs and charges**
  - Custody, administration, legal, platform fees etc
  - "Platform structure" that uses external managers generates additional layers of management fees
+ **Transaction costs**
  + Most significant for active funds and managers without an internal fund line-up (bid/ask, inefficient cash holding, etc.)
+ **Implementation inefficiencies**
  - Derivatives: ("slippage" and various rolling costs)
  - ETF usage: implicit ETF fees



Source: Pensions Insight.

DIVERSIFICATION TRENDS IN DC

Traditional approach to DC defaults: the equity-based lifestyle approach

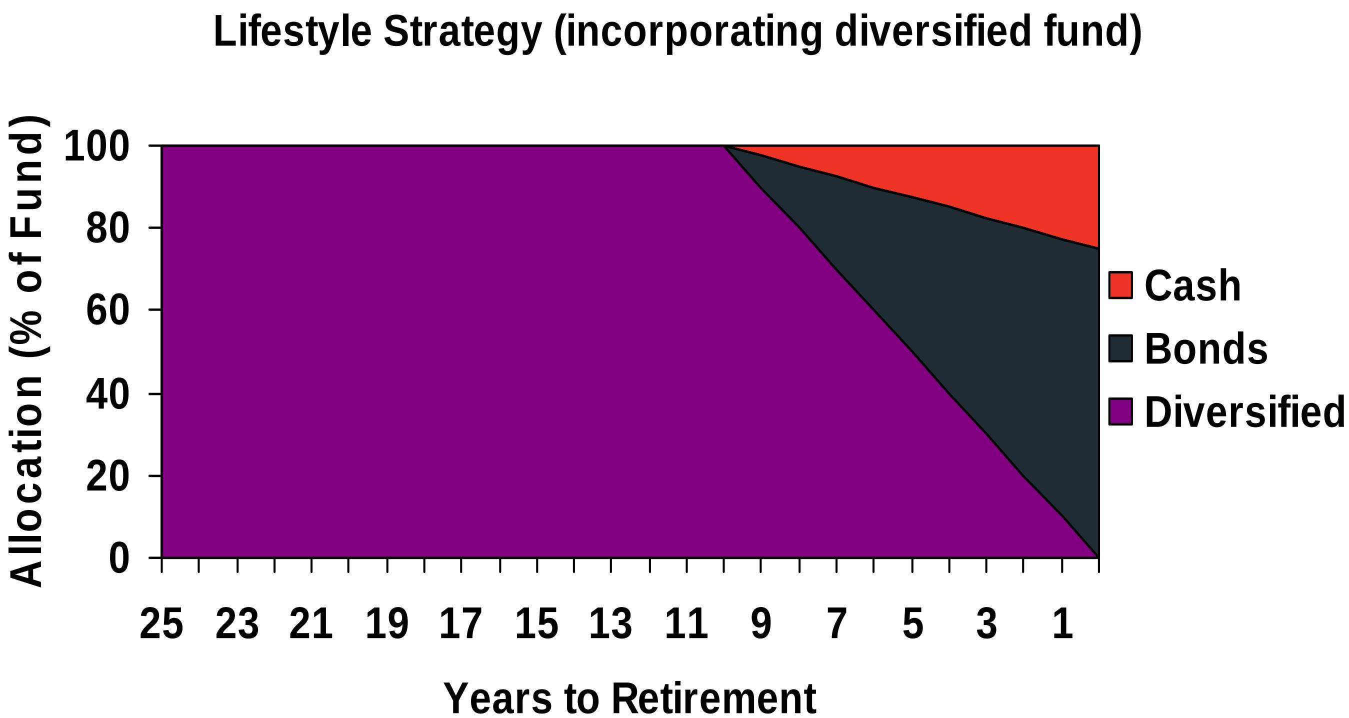
- “Lifestyling” is largely equity-focused but involves switches near retirement
- A simple lifestyle approach as shown below

- Cash element “locks in” a cash lump sum; bonds element “locks in” to annuity prices
- Different lifestyle approaches have different speeds of phasing, over different time periods

Source: LGIM

Alternative lifestyle example

- The lifestyle example below uses a diversified fund to reduce equity exposure and gain exposure to a wider range of assets



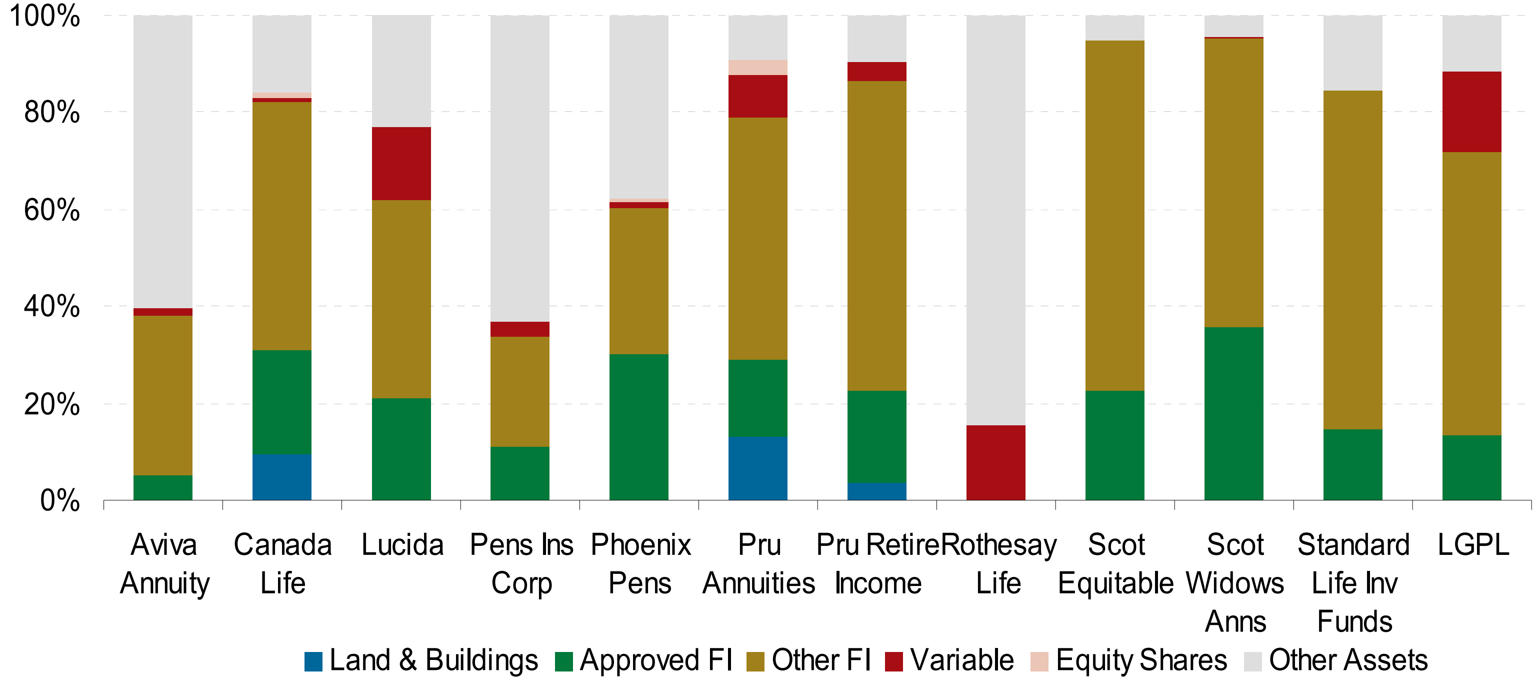
Source: LGIM

DIVERSIFICATION TRENDS IN ANNUITY FUNDS

Annuity funds' diversification

- Constrained by regulatory requirements for high quality cashflows; regulation favours fixed income and similar assets
- Industry's UK regional credit bias was unhelpful in 2008-2009
- Some diversification examples:
  - Aviva: property-backed lending, leading a wider industry trend towards collateralized assets
  - L&G: focus on global diversification credit, more recently sale & leaseback (from 2010) property-backed lending (from 2012)
  - Prudential: private debt, small slice in equity

Annuity fund investment strategies



Source: FSA Annual Returns 2011

DIVERSIFICATION: TOE-DIPPING HAS LIMITED VALUE

Case study – Big Crane Manufacturing Pension Scheme

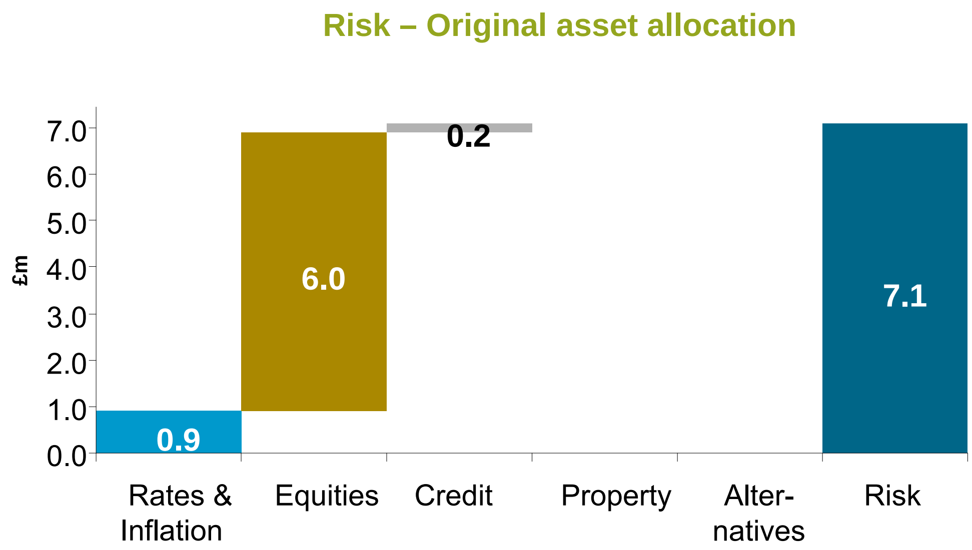
Assets £40m

50% growth portfolio invested in	• Global Equity 70:30 £20m
50% matching portfolio invested in	• Gilts £ 8m • Index Linked Gilts £ 8m • Corporate Bonds £ 4m

Liabilities £50m

- 80% funded
- Split is Real 75%; Fixed 25%
- Duration 20 years

Impact on risk ("1 in 20. Value at Risk")



- Growth assets
  - £20m Global Equity 70:30 Fund
- Matching assets
  - £8m Gilts, £8m Index Linked Gilts, £4m Credit

Source: LGIM, picture is for illustrative purposes only.

Case study – Big Crane Manufacturing Pension Scheme

Initial asset allocation

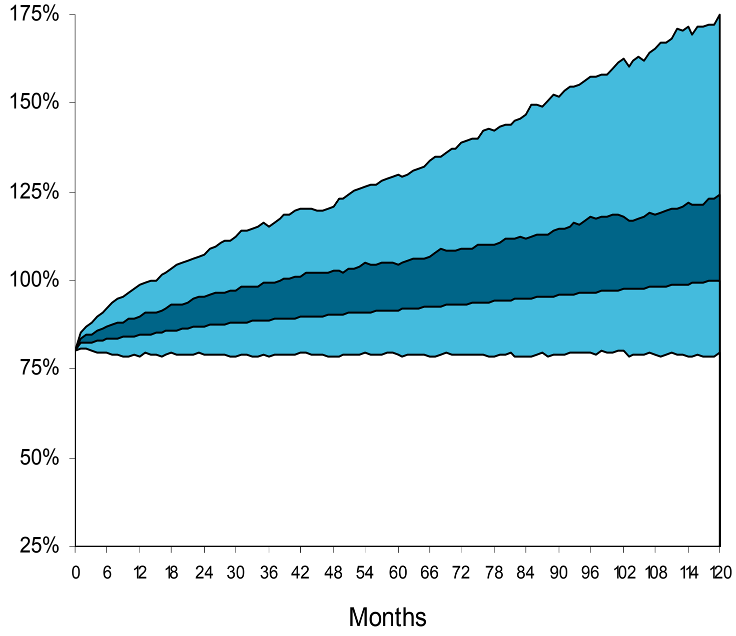
Global Equity	£20m
Gilts	£ 8m
Index Linked	£ 8m
Corporate Bonds	£ 4m

Adding some diversification asset allocation

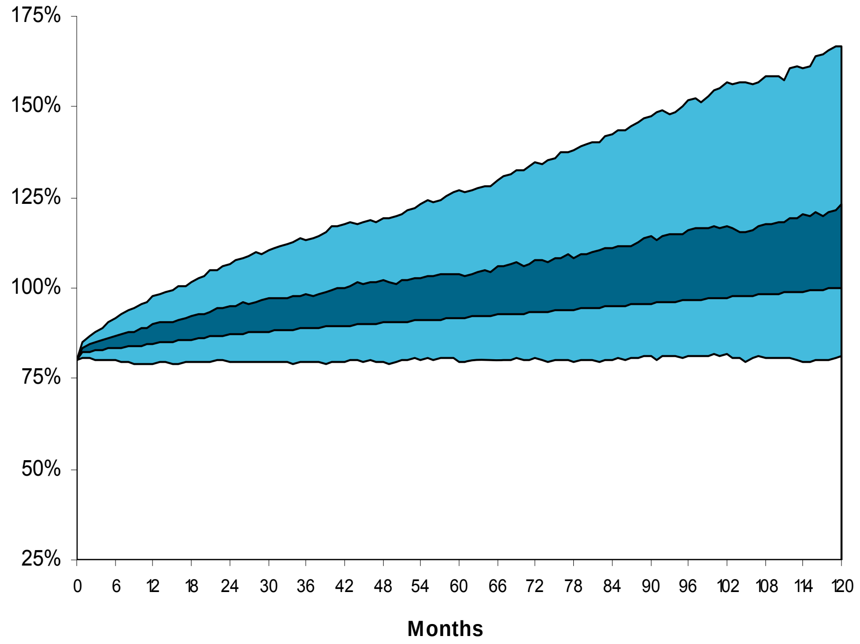
Global Equity 70:30	£16m
Property	£ 2m
Emerging Markets	£ 2m
Gilts	£ 8m
Index Linked Gilts	£ 8m
Corporate Bonds	£ 4m

Comparison – little impact

Starting allocation



Adding some diversification



Source: LGIM, picture is for illustrative purposes only.

FULL DIVERSIFICATION: RISK REDUCTION

Case study – Big Crane Manufacturing Pension Scheme

Initial asset allocation

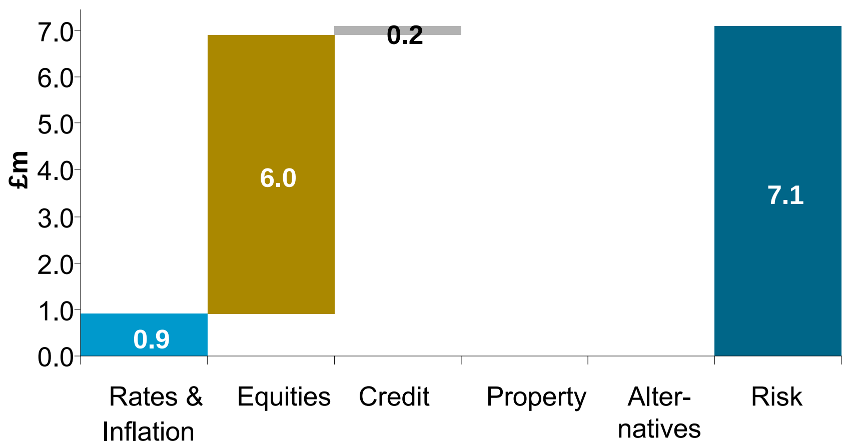
Global Equity	£20m
Gilts	£ 8m
Index Linked	£ 8m
Corporate Bonds	£ 4m

Full diversification

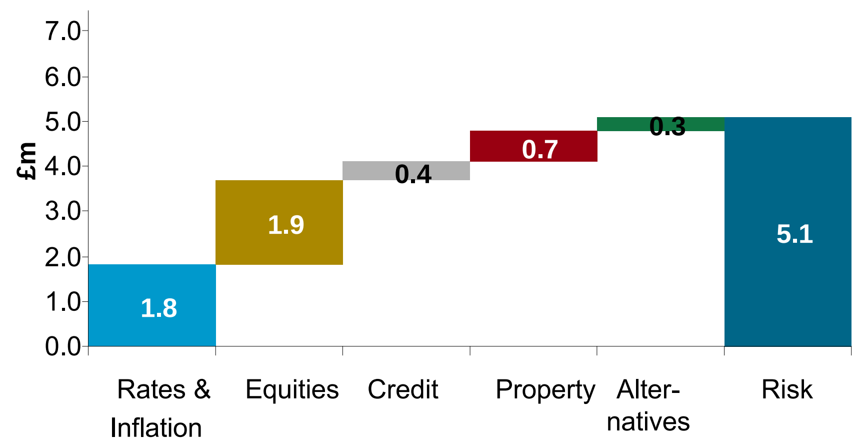
Diversified Fund	£20m
Gilts	£ 8m
Index Linked Gilts	£ 8m
Corporate Bonds	£ 4m

Impact on risk

Risk – Original asset allocation



Risk - Diversified asset allocation



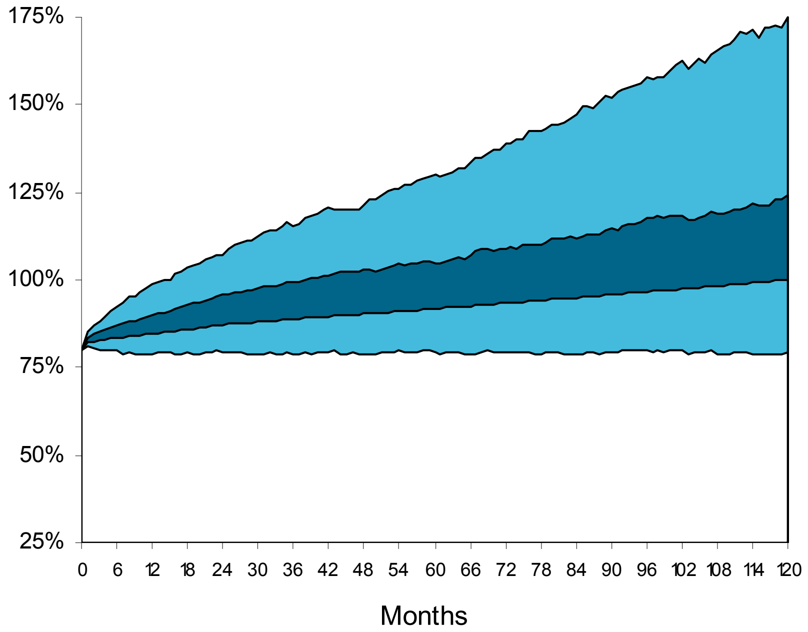
- Growth assets
  - £20m Global Equity 70:30 Fund
- Matching assets
  - £8m Gilts, £8m Index Linked Gilts, £4m Credit

- Growth assets
  - £20m Diversified Fund
- Matching assets
  - £8m Gilts, £8m Index Linked Gilts, £4m Credit

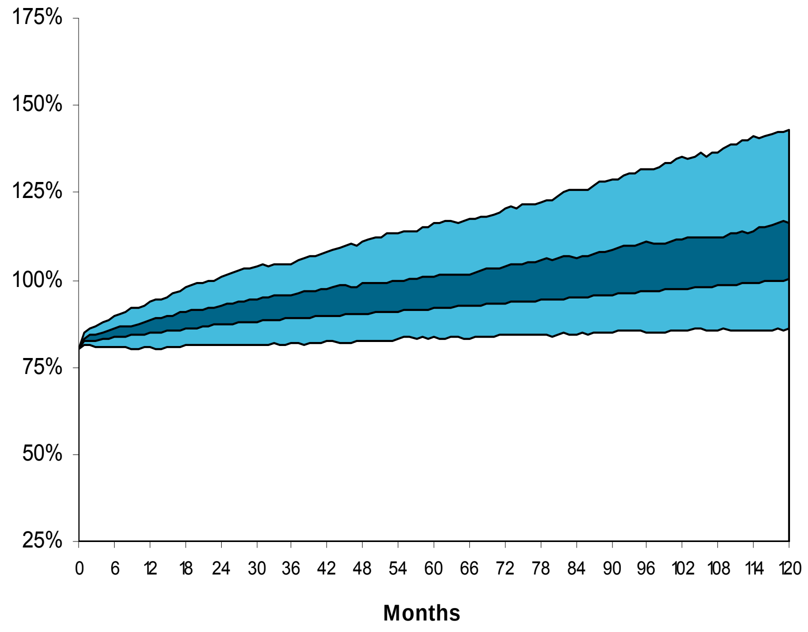
Source: LGIM, picture is for illustrative purposes only.

Comparison – much better risk control

Starting allocation



Fully diversified



Source: LGIM, picture is for illustrative purposes only.

Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenter.