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Assumption setting – expected and prudent asset returns

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Agenda

- Current challenges
- Purpose for estimating asset returns
- Different approaches to estimating asset returns
- Handling "new" asset classes
- Conclusions

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Current challenges

- Technical Provisions discount rates are subject to increasing scrutiny

- Why is this?

    – Low interest rates across the curve

    – "Search for yield" and increasing allocations to bond-like assets

    – Desire by many schemes to take no more risk than necessary

- Larger margins for prudence incentivise risk taking and/or higher cash contributions. This may be unintended (or entirely intentional!)

- Stakeholders want to understand margins of prudence, and ensure they deal sensibly with complex asset portfolios

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Is this a new problem?

> "Consulting actuaries are very good at making calculations. They are frequently terrible at making the assumptions upon which the calculations are based. In fact, they well may be peculiarly ill-equipped to make the most important assumptions if the world is one of economic discontinuities. They are trained to be conventional. Their self-interest in obtaining and retaining business would be ill-served if they were to become more than mildly unconventional…"
>
> Warren Buffett, October 1975 memorandum as reprinted in 2013 Berkshire Hathaway Annual Report, page 119

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Purpose for estimating asset returns

Statutory valuations (typical UK approach)

- **Prudent estimate** – a key input for the Technical Provisions discount rate

- **Realistic estimate** – used to determine expected contribution to the recovery plan from asset returns in excess of the discount rate
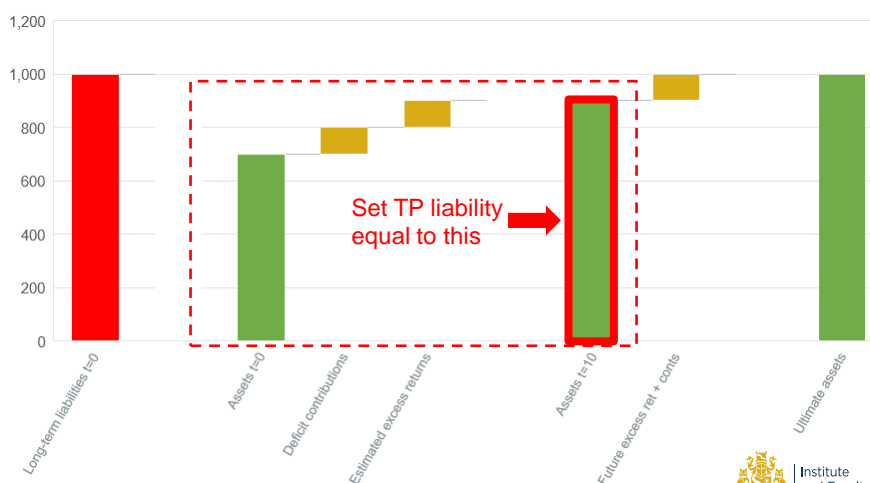
Other purposes

- Long-term planning (eg setting de-risking triggers, path to run-off, etc)

- Accounting disclosures (eg US GAAP)

- Transfer value bases

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Typical statutory valuation approach

Set TP liability equal to this

Figures shown in present value terms

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Estimating risk-free returns

- Necessary starting point for subsequent calculations:
    1. Identify a risk-free asset (eg gilts, Libor swaps, Sonia swaps)
    2. Build a curve based on observed yields, interpolate for "gaps"
- Inflation curve (and LPI) built up in a similar way
- Cash rates – subjective and may not be market consistent (eg reversion to a long-term state). Used by some
- Key benefit of this approach is to identify replicating asset portfolio
- Common historic simplification was to use a spot yield approach

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Estimating asset returns

Economic scenario generator approach

- Full stochastic asset model, or a simplified version
- Various different underlying assumptions
- Covers a range of asset classes, can deal with complex portfolios

Economic model (eg Gordon growth model)

- Expected return based on economic variables and assumptions
- Worked well for UK equities and gilts during the 1980/1990s

Yield based model

- Expected return = Portfolio yield – Defaults / Costs / Reinvestment
- Suitable for assets where contractual cashflows dominant

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Estimating future asset returns – ESG approach

- The ESG approach is typically similar to the below:
  - Market consistent curves for risk-free bonds and credit spreads
  - Risk premia overlaid on cash (or bond) assumptions based on historic data, to obtain asset class returns
  - Risk distributions could be any of: random walk, time series, option implied, economic "cascade"
  - Asset class returns aggregated with correlation matrix or copula
- Implementation questions: what about asset classes not in the model? time horizon? alpha? changing asset allocation over time?
- How should prudence be allowed for – percentile or haircut (eg 0.5% reduction, or take 75% of excess return) to the best estimate?

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Comparing different ESG approaches

- Comparing different models is a complex subject given the wide range of available models
- Different models can be calculated to the same assumptions, giving different results due to model structure
- Key questions:
  - Purpose and intended uses of model
  - Data driven (time series) vs parametric approach
  - Historic observation period used for calibration, and its relevance
  - How is sparse data dealt with
  - Use of judgement, eg reversion characteristics, interest rate floor
  - Calibration – choice of assumptions

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Estimating future asset returns – economic model approach

- An economic model is based on the premise that asset class returns over the long-term will depend on the initial values of economic variables and will converge to some fundamental value

- An example is the Gordon growth model for equities:

  Return = Dividend yield + Real Dividend Growth + Inflation

- The return estimate is very sensitive to the dividend growth assumption

- Similar approach used for gilts in the MFR calculation, but assumes coupon rates and modified durations are stable over time

- Such models are not amenable to adding margins of prudence, except by altering underlying assumptions (eg growth rate)

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Estimating future asset returns – yield approach

- The yield approach is typically similar to the below:

  – Measure the yield to worst (or equivalent measure) for the assets

  – Reduce the yield to allow for default losses, costs and expenses

  – Loss given default should allow for recovery rates

  – Further reduction may be justified for: a) if bonds sold on downgrade; b) reinvestment risks

- Historic data would typically be used for defaults, downgrades, recovery rates

- Method only produces a single return estimate (not a distribution)

- Prudence typically applied through "haircuts" and reinvestment

- Suitable for corporate bonds, private debt, loans, real estate debt, leases, etc

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Yield approach – worked example

➤ Yield = 4.2% pa (US investment grade bonds)

➤ Cross-currency hedging costs = 1.2% pa (USD to GBP)

➤ Management fees and expenses = 0.2% pa

➤ Defaults

   ➤ Average credit quality = BBB

   ➤ Average duration = 15 years

   ➤ 15-year average cumulative default rate for BBB = 9%

   ➤ Average recovery rate for BBB = 40%

   ➤ Best estimate allowance for defaults = (9% x (1 – 45%)) / 15 = 0.33% pa

➤ **Net yield = 4.2 – 1.2 – 0.2 – 0.3 = 2.5%**

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Mixing approaches

• As schemes move from a growth orientated portfolio towards an income based portfolio, mixing models is becoming more common:

   – ESG approach for equities, absolute return, "total return" assets

   – Yield approach for fixed and floating rate bonds

• Key considerations:

   1. Which assets provide most of their return from contractual income?

   2. How is the portfolio expected to evolve over time?

   3. What about reinvestment? Where are we in the cycle?

   4. What should the margin for prudence be? (eg haircuts under yield approach, or percentiles if using an ESG)

   5. Diversification – too much / too little prudence?

   6. Consistency of prudence across asset classes?

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Sense checks

- Estimated returns need to be plausible at a total scheme level

- UK asset real returns since 1899

Last	2015	10 years	20 years	50 years	116 years*
Equities	-0.1	2.3	3.7	5.6	5.0
Gilts	-0.6	3.0	4.3	2.9	1.3
Corporate Bonds	-0.5	1.8			
Index-Linked	-3.4	2.5	3.8		
Cash	-0.7	-1.1	0.9	1.4	0.8
Inflation	1.2	3.0	2.8	5.9	3.9

Real investment returns (% pa)

	Equities	Gilts	Index-linked	Cash
1905-1915	-0.2	-2.2		-0.5
1915-25	3.9	-1.1		0.8
1925-35	8.7	10.8		4.7
1935-45	2.4	0.3		-2.3
1945-55	5.3	-5.4		-3.0
1955-65	7.3	-1.0		1.8
1965-75	0.1	-5.4		-1.4
1975-85	11.0	5.2		1.5
1985-95	9.9	6.8		5.2
1995-2005	5.0	5.6	5.2	2.9
2005-2015	2.3	3.0	2.5	-1.1

Source: Barclays Research

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28 September 2017   Source: Barclays Equity Gilt Study 2016   15

Regime changes

- Regime changes are <u>very</u> difficult to predict

- Does this matter for discount rates, which are typically between the central estimate and 1 standard deviation away?

- But many (most?) regime changes alter the central estimate too:

    - Tech boom and bust (1998-2001)

    - Financial crisis and QE (2008-2011)

    - Euro-zone sovereign crisis (2010-2013)

    - Brexit and low growth for longer (2016-2020?)

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Conclusions

- As schemes move from a growth orientated portfolio towards an income based portfolio, assumptions are being scrutinised more carefully

- No right answer, and all methods of estimating future asset returns make a number of assumptions

- Regime change (ie "missing the trend") remains the single largest risk under all approaches. Thoughts on robustness:

  – Yield approach – robust unless default risks change. Reinvestment risks an issue for longer duration schemes

  – ESG approach – many assumptions but models recalibrated frequently so will adapt over time

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Questions

Comments

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