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Investment & Actuarial Consulting, Controlling and Research. www.ppcmetrics.ch
Asset Liability Management Today – Is it Still ‘Fit for Purpose’?

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PPCmetrics AG
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"All models are wrong. Some models are useful."

George Box, Professor Emeritus of Statistics, University of Wisconsin-Madison
Introduction
Asset Liability Management: Risk Perspective

• The target of asset liability management is to align the assets to the liabilities, i.e. managing risks due to mismatches between the assets and liabilities.

Main Risks of a Pension Fund

- Interest Rate Risk
- Inflation Risk
- Equity Risk
- Real Estate Risk
- Asset-Specific Operational Risk

- Longevity Risk
- Disability and Death Risk (Active Members)
- Interest Rate Risk
- Inflation Risk
- Liability-Specific Operational Risk

▶ Interest Rate Risk and Inflation Risk are the only risks to match!
Introduction
Asset Liability Management Process

• In addition, **overall risk** (compared to the liabilities) **is relevant!**
Introduction
Risk Budget

1. Step
Determining the return/risk budget

- Asset & Liability Risk
  Interest Rate Changes
  How does the liability hedging portfolio look like?

- Asset Risk
  Equity, Real Estate, Tactical Allocation, Selectivity, Liquidity,
  What asset risk should we take to increase expected return? → Risk Budget

- Liability Risk
  Longevity, Disability and Death, …
  How relevant are actuarial risk and how do we manage them?

2. Step
Determining an optimized investment strategy

- Additional, ongoing monitoring and evaluation of risks that are not or hardly measurable
  • Model risk
  • Reputation risk
  • …
Introduction
Investment Strategy

• The **mean variance analysis** of Markowitz (1952) is still most of the time the state of the art tool, to calculate the **expected risk-return profile** of the investment strategy.

  - Other methods are mostly based on Monte Carlo simulations.

• However, you have to keep in mind that especially in the case of the expected return, it **is not a point estimate**.
  - However, all the input factors **shape the probability distribution of possible outcomes**.
Initial Problem
Investment Strategy and Simple Optimization

Source: Morningstar Optimizer with PPCmetrics Return and Risk Assumptions

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Initial Problem
Investment Strategy and Model Risk

• The **risk of an investment strategy** is often assessed by **value at risk (VAR)**
  – E.g., the investment strategy has a 95%-VAR (1 year) of 9 million.

• Does a **large loss (larger than expected)** mean that risk management, i.e., ALM-Study has failed?
  – E.g., what, if there occurs a loss of CHF 14 million?

• **Bad luck vs. bad risk model**
  – Bad luck ⇒ «could not estimate better ex ante»
    • 99%-VAR points to a loss of 15 million
  – Bad risk model ⇒ «should have estimated better»
    • E.g., ignoring an important risk (factor), increasing correlations etc.

▷ **So how can we get «good» input factors for the model?**
Input Factors
Estimation Methods: Large Variety

• Models to estimate the expected returns, volatilities and correlations can be generelly classified as:
  – **Historical mean** (e.g., as long as possible, 5 years, …)
  – **Surveys** (mostly on expected risk premiums)
  – **Market data** (e.g., implied volatility)
  – **Simple economic models** (e.g., dividend discount models)
  – **Simple statistic models** (e.g., exponentially weighted moving average model)
  – **Econometric models** (e.g., cross sectional regressions, time-series regressions on lagged variables, GARCH)

▶ But what is done in Switzerland?
Primary ALM studies are done by consultants with the following methods:

- **Economically derived expected return** through a risk premium approach, volatility and correlations calculated **historically with as much data as possible** and with adjustments for illiquidity, skewness and fat tails.

- Estimation of expected returns for the **next couple of years** through **market data** if possible and **consensus forecast by experts**, volatility and correlation calculated **historically with 10 years of data**.

- **Time-varying short- and mid-term** expected return, volatility, and correlation derived through **economic scenario analysis**.

» **Diminishing borders between strategic and tactical asset allocation?**
Input Factors
Expected Return: Rolling Yearly Return

Source: PPCmetrics, Bloomberg
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Input Factors
Expected Volatility: Historical 36-Month Volatility

Source: PPCmetrics, Bloomberg

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Input Factors
Rolling Correlations with Swiss Government Bonds

Source: PPCmetrics, Bloomberg
Input Factors
Need for a Reality Check

Return and Risk Assumptions

Indexed Total Return Index (31.12.2005 =100)

- 95% Confidence Interval
- 80% Confidence Interval
- 50% Confidence Interval
- Expectation PPCmetrics
- Realized (Pictet BVG 25)

Source: PPCmetrics, Bloomberg
"Prediction is very difficult, especially if it's about the future"

Niels Bohr
Nobel Laureate in Physics, Winner of the Hughes-Medal
Bottom-Line
Take-Aways

- **Do not mix-up tactics with strategy!**
  - Including the current (relative) valuation of the various asset classes leads to a «tactical asset allocation».
  - Return and risk assumptions have to be long-term.

- **Beware of the fallacy of a false precision or spurious accuracy!**
  - Optimization should be limited to groups of assets that have high intragroup and low intergroup correlations.
  - Relevant for the riskiness is the equity-bonds question and not the allocation within an asset class (e.g., «high yield vs. crossover bonds»)
Thank you!

"Wall Street indices predicted nine out of the last five recessions!"

Paul A. Samuelson
Nobel Laureate in Economics
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