



PPCmetrics AG  
Investment & Actuarial Consulting,  
Controlling and Research. [www.ppcmetrics.ch](http://www.ppcmetrics.ch)



## Asset Liability Management

# Asset Liability Management Today – Is it Still ‘Fit for Purpose’?

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**PPCmetrics AG**

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Bern, September 23, 2015

# Introduction

## Are Models Really Useless?

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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

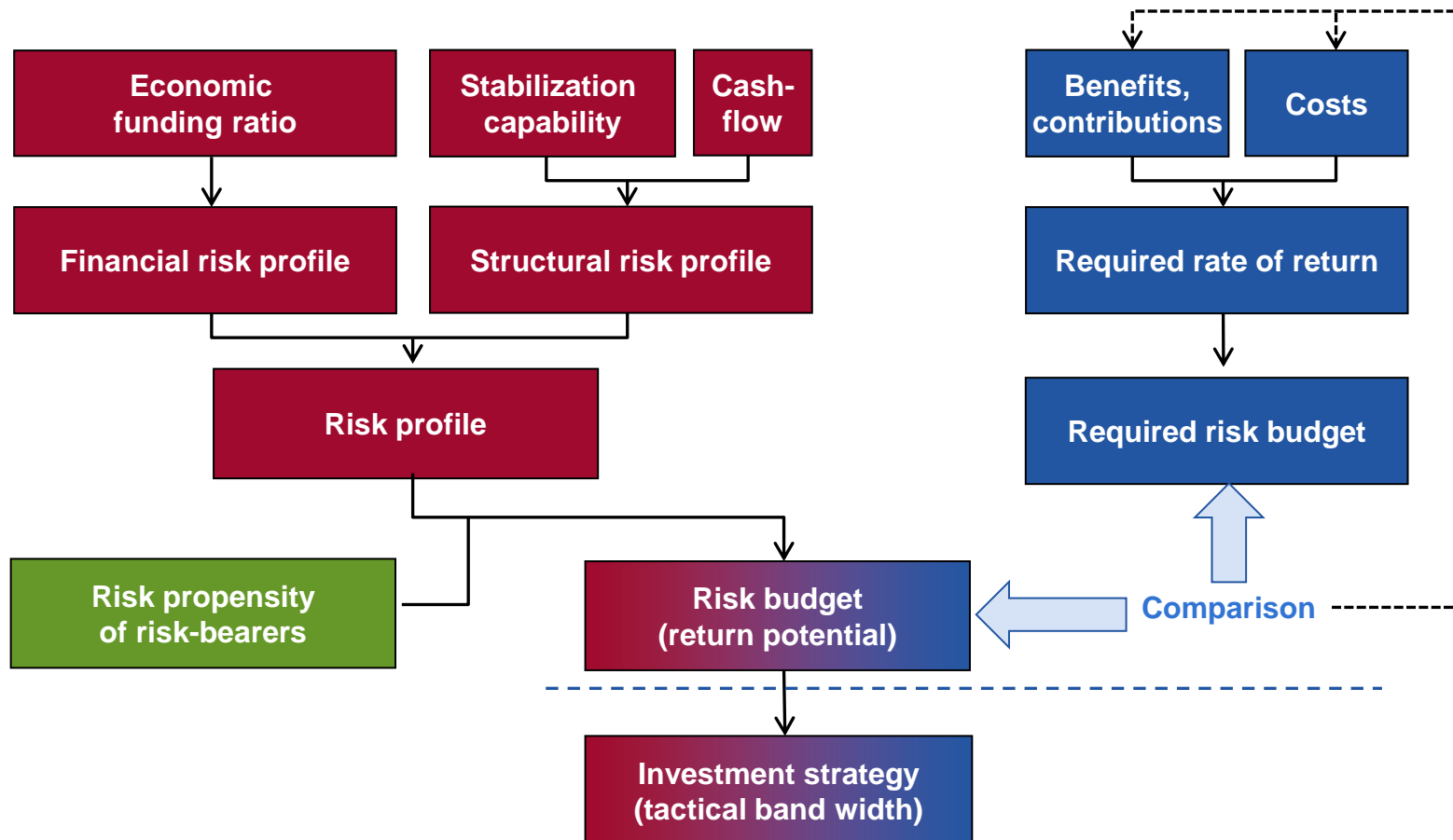
- Longevity Risk
- Disability and Death Risk (Active Members)
- **Interest Rate Risk**
- **Inflation Risk**
- Liability-Specific Operational Risk

- ▶ **Interest Rate Risk and Inflation Risk are the only risks to match!**

# Introduction

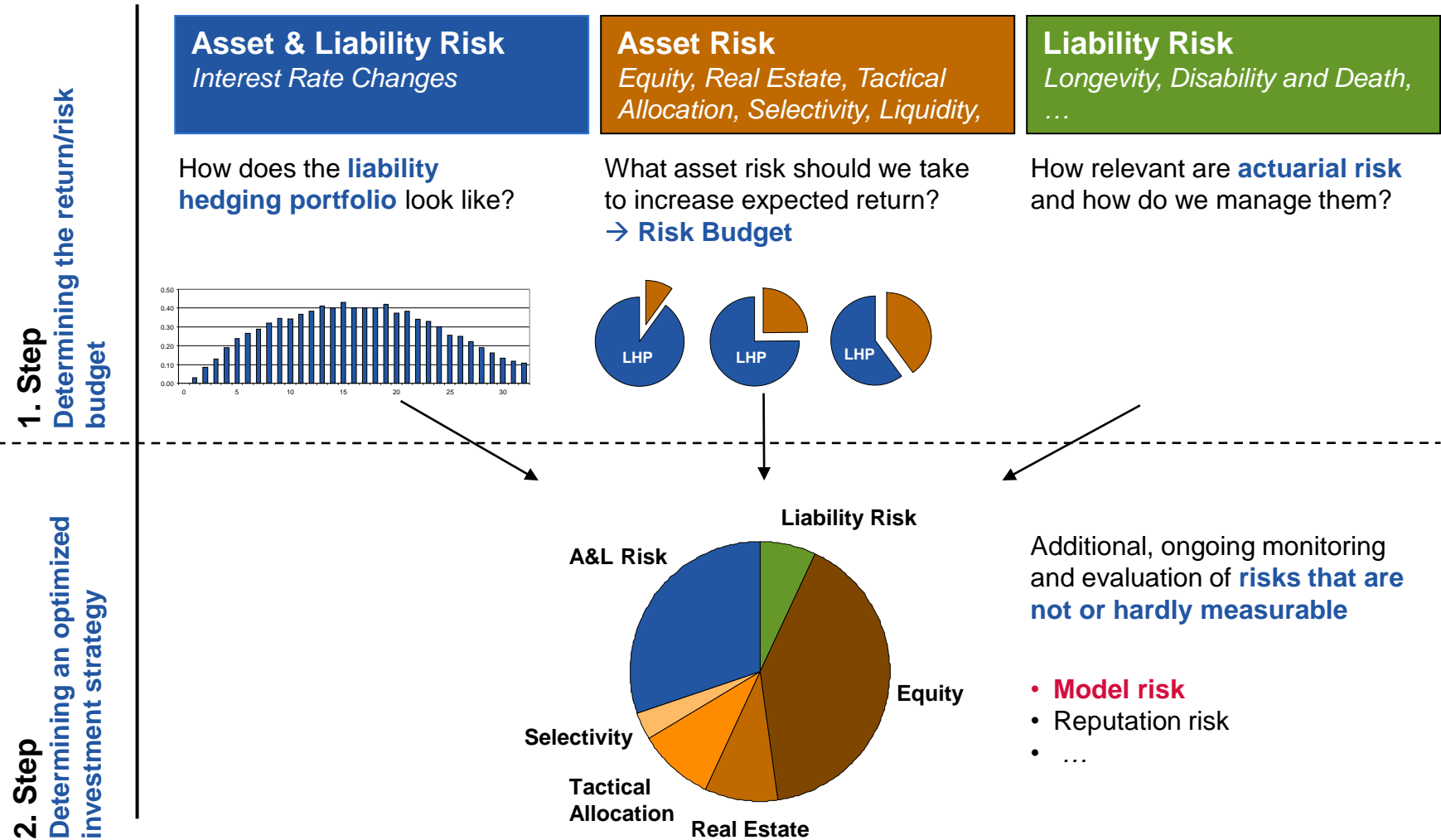
## Asset Liability Management Process

- In addition, **overall risk** (compared to the liabilities) **is relevant!**

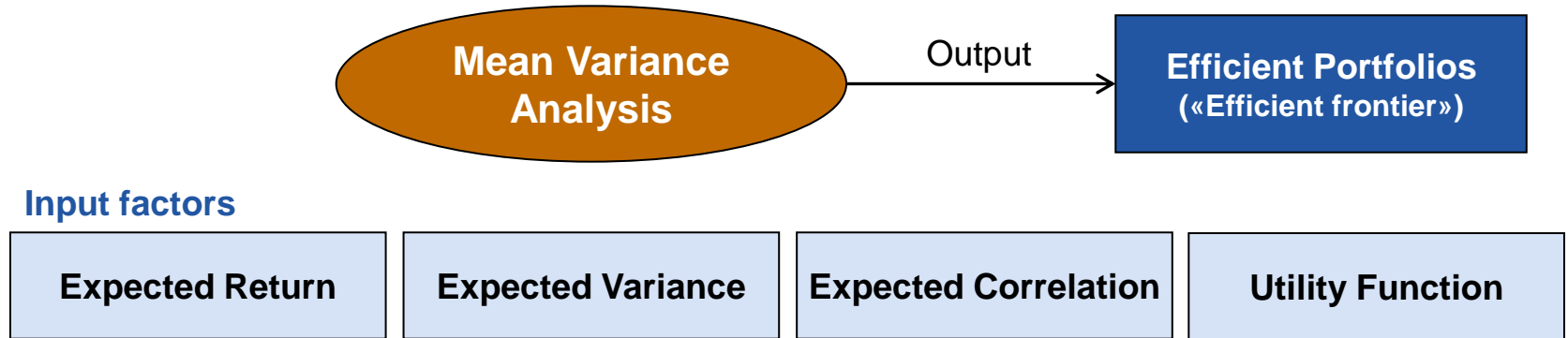


# Introduction

## Risk Budget



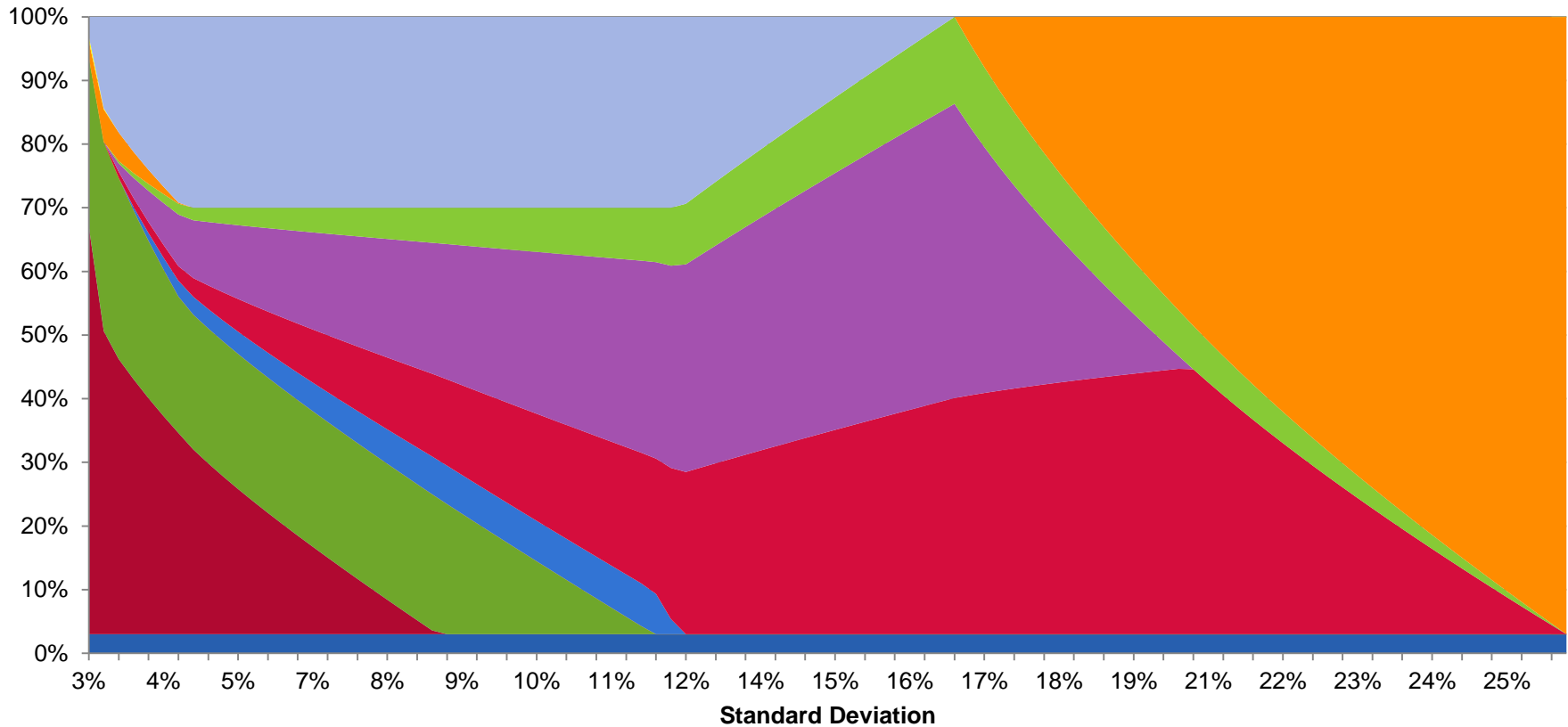
- The **mean variance analysis** of Markowitz (1952) is still most of the time the state of the art tool, to calculate the **expected risk-return profile** of the investment strategy.



- 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



- Cash
- Swiss Bonds
- Government Bonds
- Government Bonds (hedged)
- Corporate Bonds
- Corporate Bonds (hedged)
- Emerging Market Debt LC
- Swiss Equity
- Equity
- Equity (hedged)
- Private Equity
- Hedge Funds
- Unlisted Swiss Real Estate
- Real Estate (hedged)

Source: Morningstar Optimizer with PPCmetrics Return and Risk Assumptions



- 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  $\Rightarrow$  «could not estimate better ex ante»
      - 99%-VAR points to a loss of 15 million
    - Bad risk model  $\Rightarrow$  «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?**

- Models to estimate the expected returns, volatilities and correlations can be generally 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?**

# Input Factors

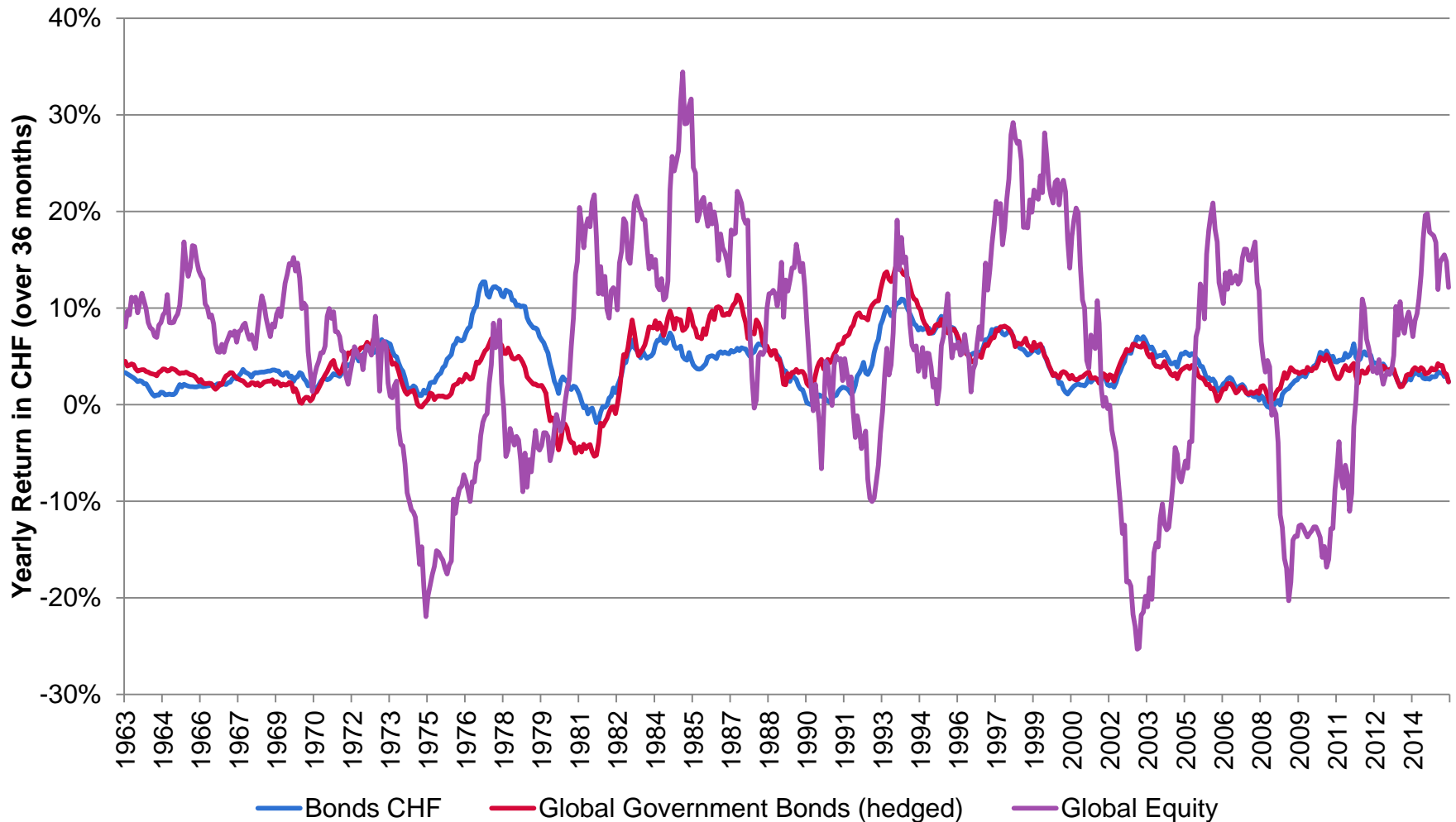
## Estimation Methods: Often used in Switzerland

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- **Primarily 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

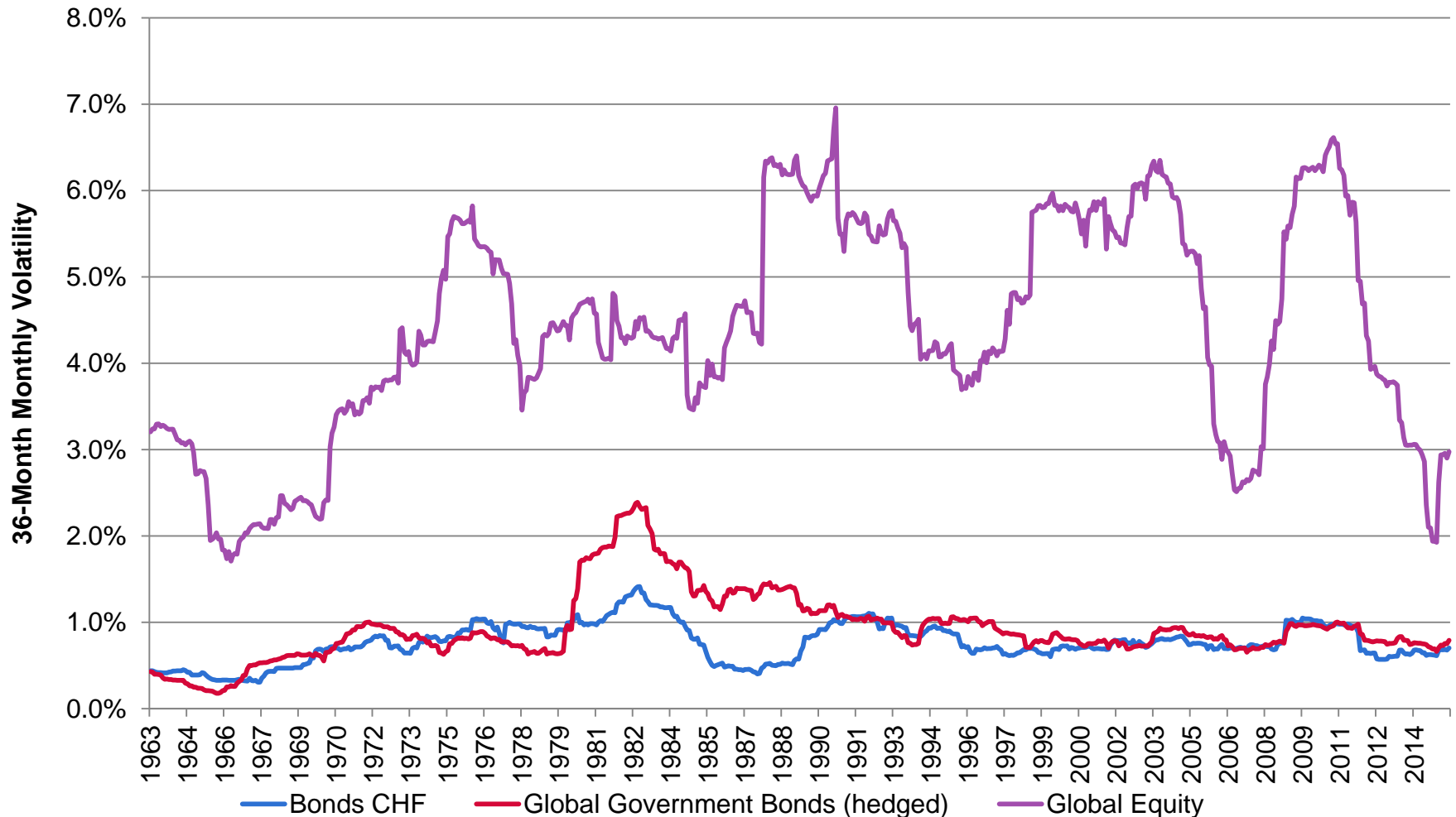
## Expected Return: Rolling Yearly Return



Source: PPCmetrics, Bloomberg

# Input Factors

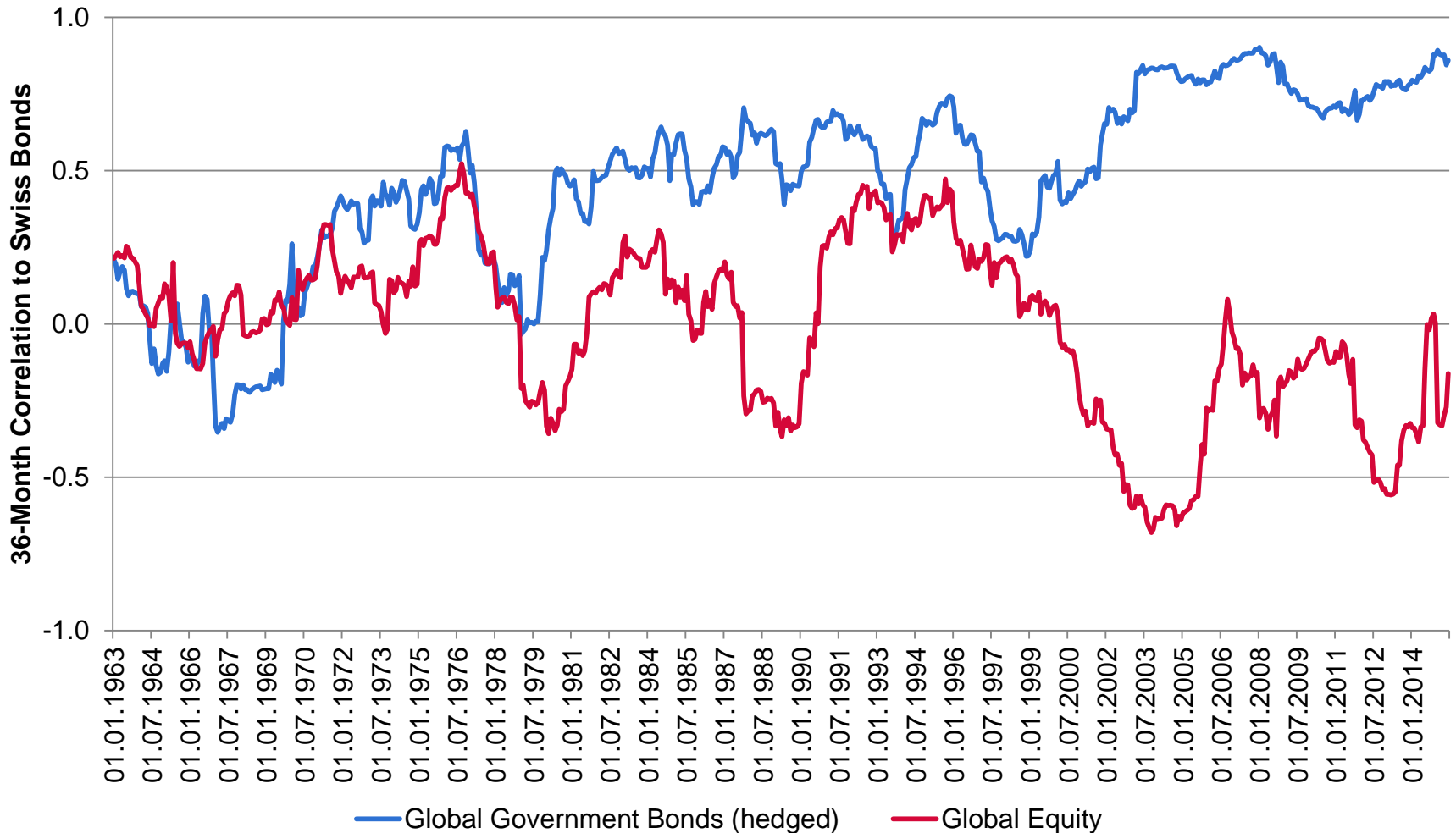
## Expected Volatility: Historical 36-Month Volatility



Source: PPCmetrics, Bloomberg

# Input Factors

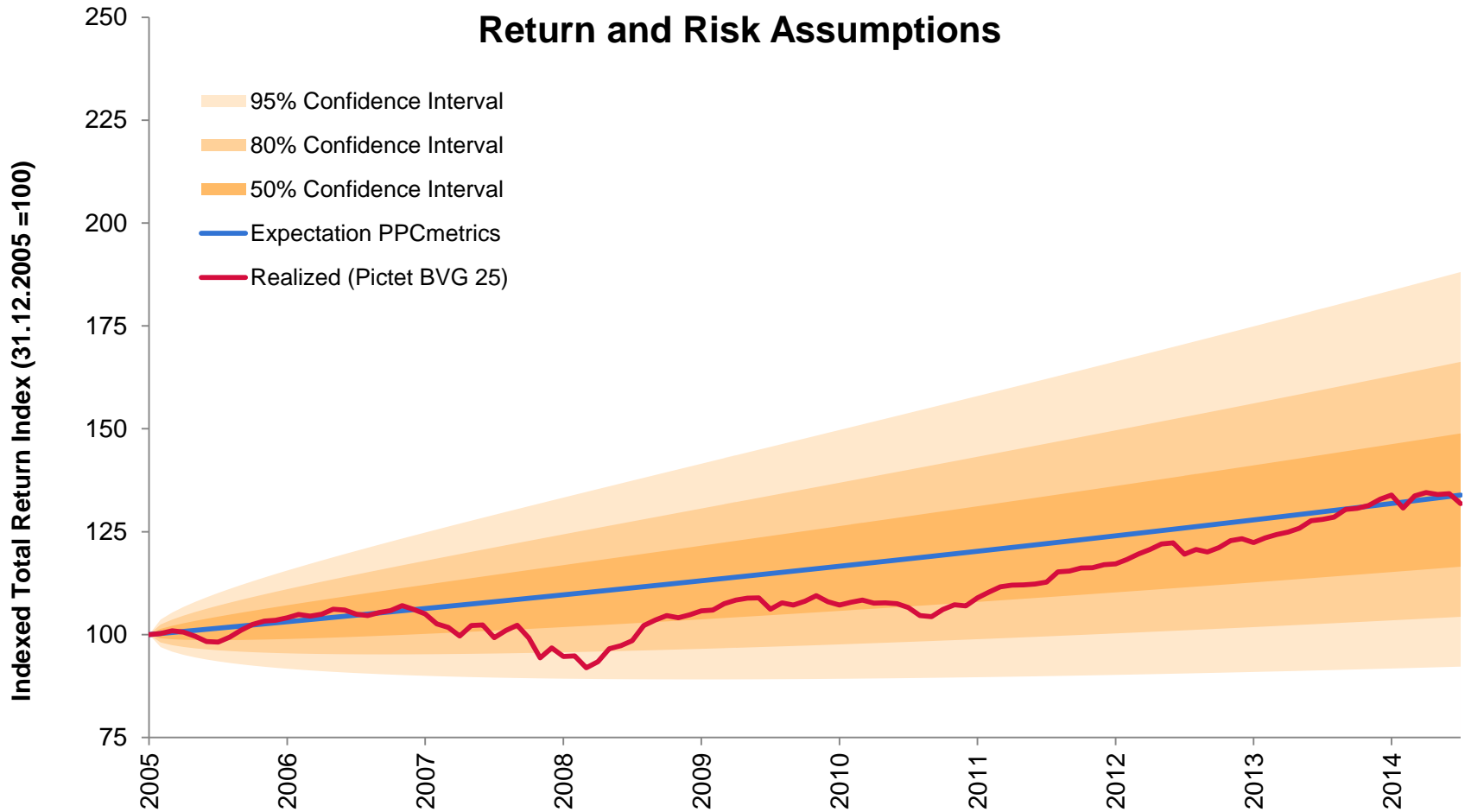
## Rolling Correlations with Swiss Government Bonds



Source: PPCmetrics, Bloomberg

# Input Factors

## Need for a Reality Check



Source: PPCmetrics, Bloomberg

# Bottom-Line

## Is Prediction Useless?

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**"Prediction is very difficult,  
especially if it's about the  
future"**

Niels Bohr

Nobel Laureate in Physics,  
Winner of the Hughes-Medal



- ▶ **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!

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

Paul A. Samuelson  
Nobel Laureate in Economics



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