# Building a Tool for Strategic Asset Allocation at a Swiss Insurance Company.
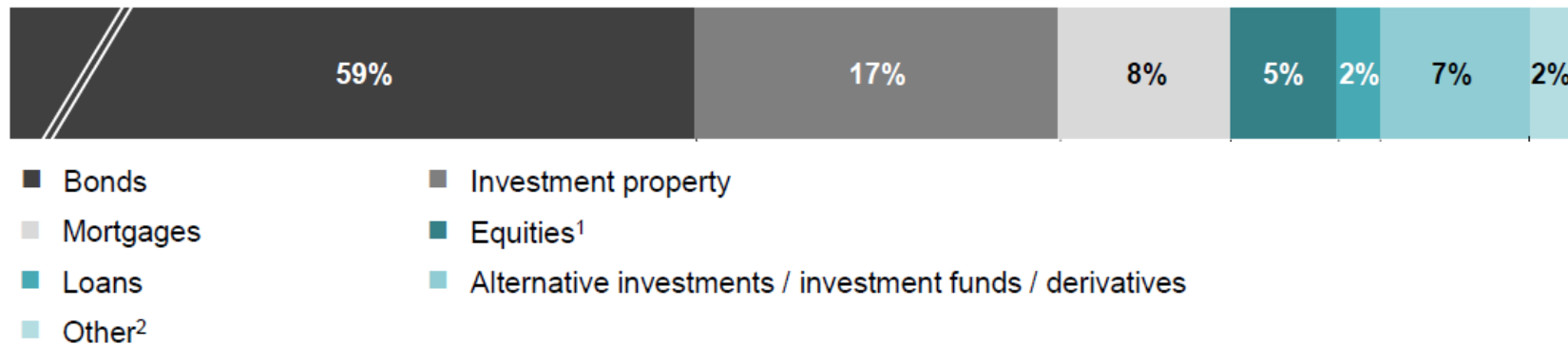
**Claus Huber**

Helvetia Insurance
23 March 2023

einfach. klar. helvetia
Ihre Schweizer Versicherung

# Helvetia Insurance.

- 3rd largest insurer in Switzerland by premium volume 2022

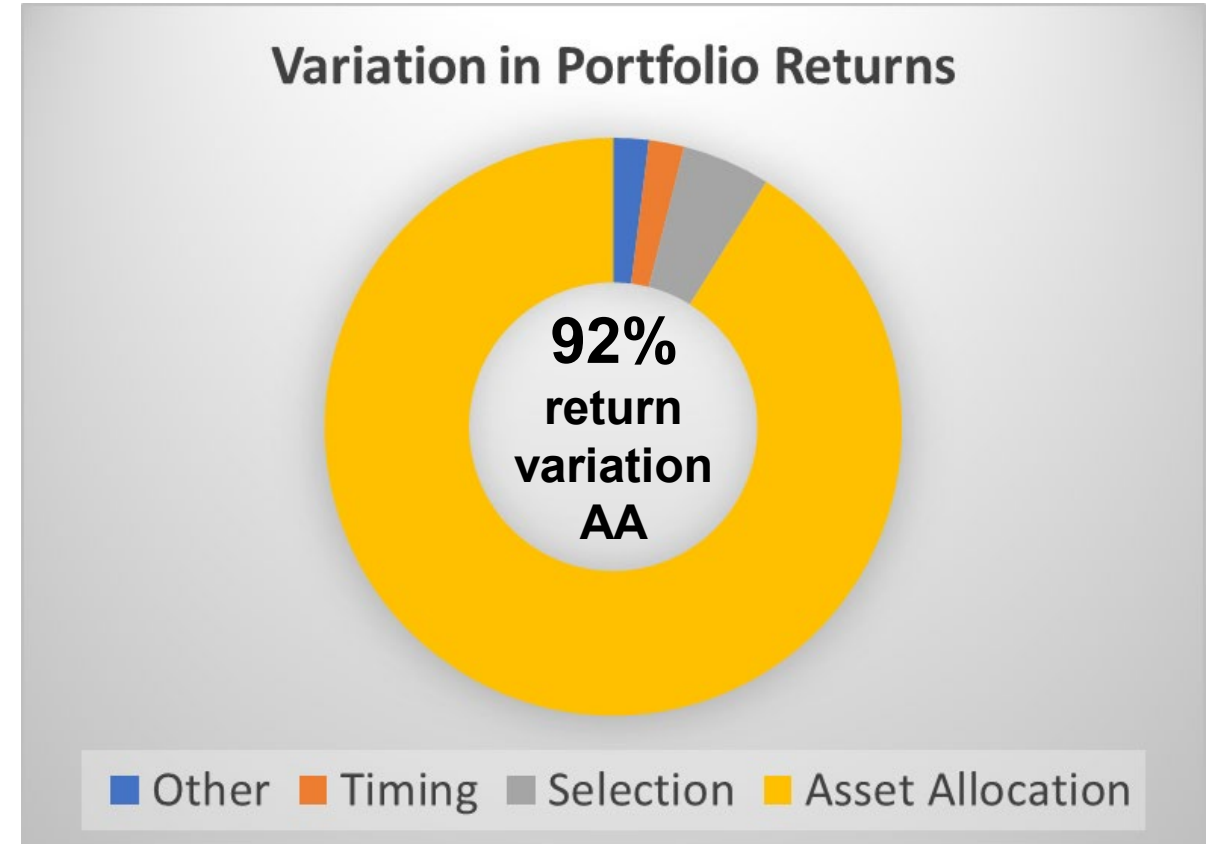- Asset Management: CHF 47 bn (2022) or USD 51 bn AuM

**Group investment portfolio by asset class, Dec 2022 (source: HV Annual Report)**

| 59% | 17% | 8% | 5% | 2% | 7% | 2% |
|-----|-----|-----|-----|-----|-----|-----|

- ■ Bonds          ■ Investment property
- ■ Mortgages      ■ Equities[1]
- ■ Loans          ■ Alternative investments / investment funds / derivatives
- ■ Other[2]

- HV is currently rebuilding its Asset Management

- Sally = **S**trategic **A**sset A**ll**ocation Tool

**helvetia** ▲
Ihre Schweizer Versicherung

# Why Strategic Asset Allocation?

- Asset Allocation exerts an important influence on variations of portfolio returns

  - Brinson / Hood / Beebower (1986), see chart to the right

- Increase capital efficiency

  - In discussions with Risk Management we must be able to prove / argue why our suggested portfolio is optimal

- Important: model & results must be explainable

**Variation in Portfolio Returns**

**92% return variation AA**

■ Other  ■ Timing  ■ Selection  ■ Asset Allocation

helvetia

Ihre Schweizer Versicherung

# Graphical User Interface.

- Excel-based GUI

| | | | Type Constraint: | Duration | Weight | ESG | | |
|---|---|---|---|---|---|---|---|---|
| **Base Currency:** | CHF | | Group Min: | 1.00 | 0% | A | | |
| | | | Group Max: | 5.00 | 30% | AAA | | |
| **Asset Classes** | **FX Hedge** | **w_min** | **w_max** | **Dur_1** | **FX_1** | **ESG_1** | **Expected Return in Local Currency** | **w_t0** |
| MM_CHF | 0% | X | X | | | | X | X |
| RatesGov_CHF | 0% | X | X | 1 | | 1 | X | X |
| CreditDM_EUR | 100% | X | X | | 1 | 1 | X | X |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| Equity_CHF | 0% | X | X | | | 1 | X | X |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| REAgg_CHF | 0% | X | X | | | 1 | X | X |
| Liabilities | 0% | X | X | | | | X | X |

helvetia
Ihre Schweizer Versicherung

# Optimised Portfolios.

- All optimisations are for Assets - Liabilities

- **Green:** Current Portfolio

- **Pink**: with "Real World" constraints
  - e.g., w_max(Equity_CHF) = 8%
         w_max(EQ) = 10%

- **Black**: Unconstrained Efficient Frontier
  - w_min = 0%, w_max = 100%

- Table shows portfolio weights *relative* to current portfolio

- For example, a value of 3% for AC_1 means that [Constrained Max. Return] overweights AC_1 by +3% vs. Current Portfolio



Efficient Frontiers
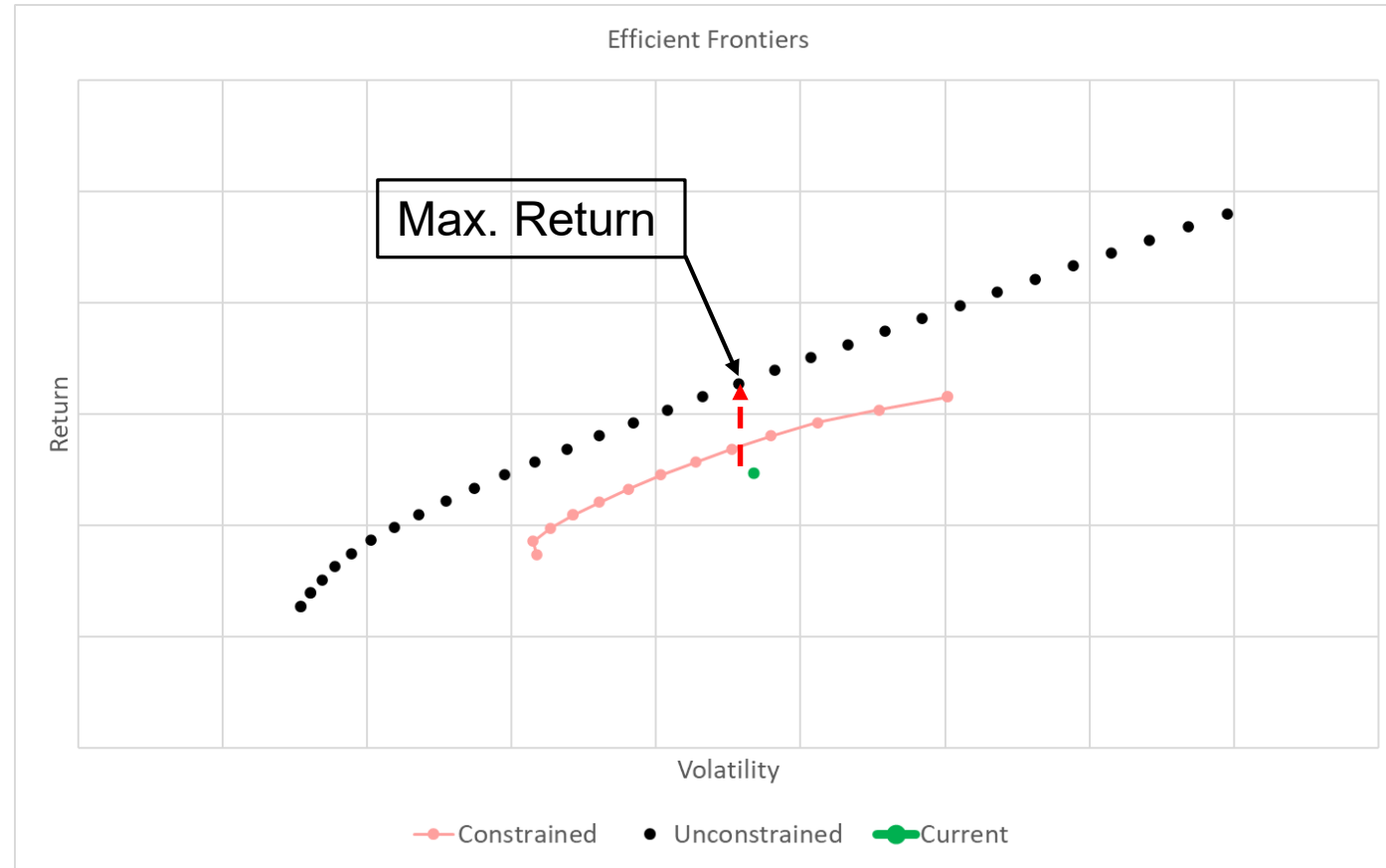
| | ER | Vol | ER/Vol | AC_1 | AC_2 | .... | AC_23 | Liabilities |
|---|---|---|---|---|---|---|---|---|
| Current | X | X | X | X | X | .... | X | X |
| Max. Return | 0.1% | 0.0% | X | 3% | 0% | .... | -2% | 0% |
| Max. Return | **0.3%** | **0.0%** | **X** | **4%** | **0%** | **....** | **-5%** | **0%** |

# Sally Roadmap: the Journey So Far.

- Feb/Mar/Apr 2022:
  - Set up SAA team @ Helvetia
  - Beauty Contest between several 3rd party vendors
  - Definition of use case, preparation of demos, creation of score card for valuation of providers (criteria are, for example: Relevance, Customisability, …)

**Select Criteria**

| | Vendors | | | Self-built @ Helvetia | | |
|---|---|---|---|---|---|---|
| **Total Score** | 2.52 | 2.37 | 2.25 | 2.15 | 2.50 | 2.65 |
| **Validity (3 = high Validity, 1 = low Validity)** | **V1** | **V2** | **V3** | **@ Helvetia** | **Stage 2** | **Stage 3** |
| **Relevance** | | | | | | |
| Insurance specific constraints, e.g,. SST, S2, …. | 2.7 | 2.3 | 2.0 | 1 | 2 | 3 |
| **Customisability** | | | | | | |
| Tool can be easily customised.<br>For example: User can change return & risk inputs.<br>New asset classes (e.g., Swiss Real Estate) can be added. | 2.7 | 2.7 | 2.7 | 2 | 3 | 3 |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |

**helvetia**
Ihre Schweizer Versicherung

# Sally Roadmap: the Journey So Far.

- Apr 2022: Decision to start with self-implementation of a basic SAA model

  - No clear vision when we started

  - R

  - Start with a small solution

  - Fail? → we still would have gathered experience and could have worked much more efficiently with a 3rd party vendor

helvetia

Ihre Schweizer Versicherung

# Sally Roadmap: the Journey So Far.

- May 2022: Implementation of basic model in R

    - Black/Litterman (1992), also others tested / researched

    - SAA Team made several decisions during first steps / coding: for example, mapping of Asset Classes to indices (e.g., MSCI, SIX,…), how to estimate VCV, how to treat FX, what is our SAA horizon (3Y, 5Y, 10Y)?

    - Which R libraries?

    - Which data from which sources (reports, data base queries)?

    - FX hedging, risk decomposition: methodology & code modules worked out

**helvetia**
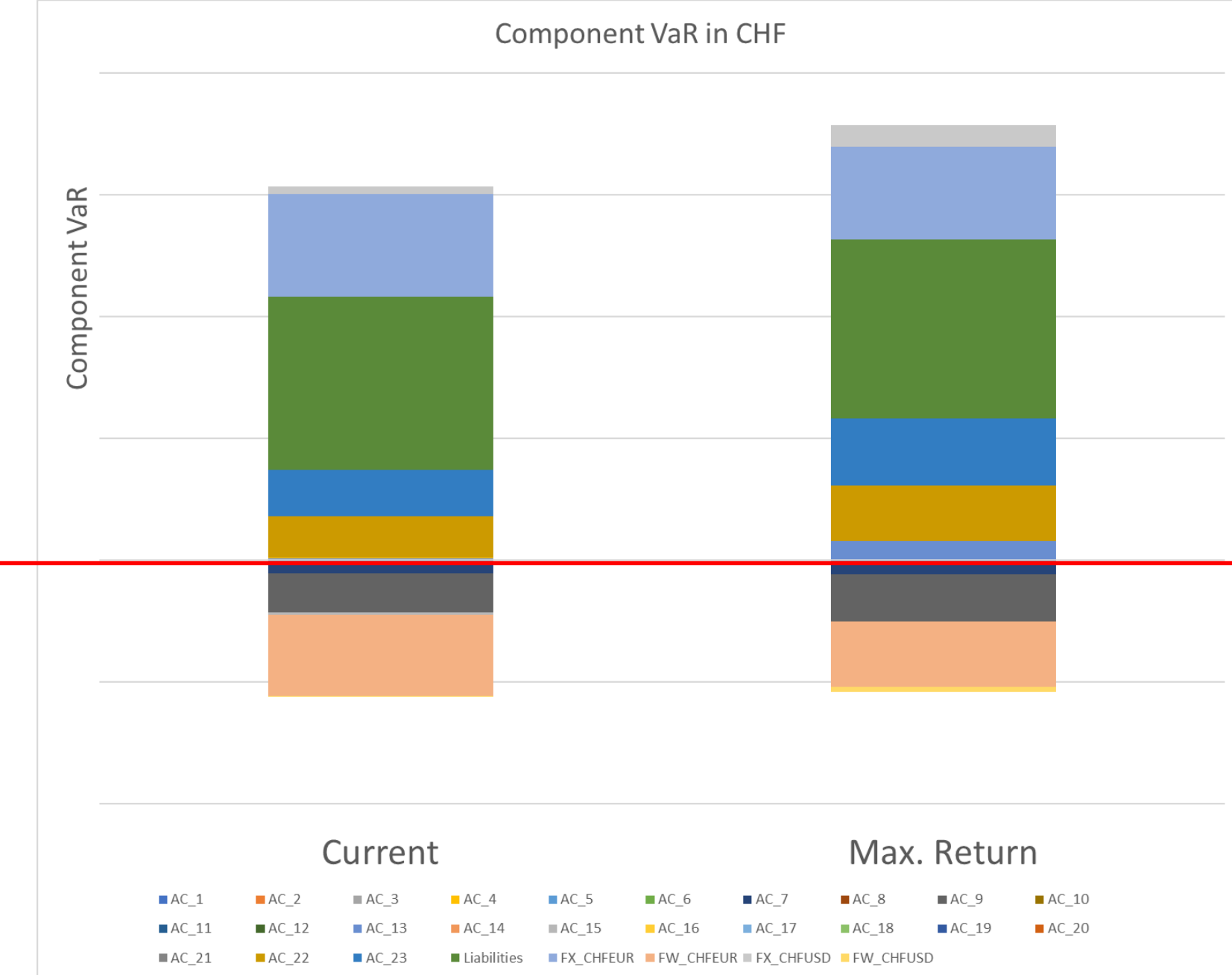Ihre Schweizer Versicherung

# Sally Roadmap: the Journey So Far.

- Jun 2022: Decision to continue with Black/Litterman only

  - Several parameters (e.g., Uncertainty Matrix $\Omega$, risk aversion parameter $\delta$ for extracting implied views) simplified or taken short cuts

  - Delivery of $1^{st}$ draft SAA 2023 based on simplified Black/Litterman

  - Several rounds of presenting results, collecting feedback, aligning further steps, e.g., Group Risk Management


- Q3, 2022: Enhanced existing Black/Litterman model

  - Provide sound underpinning of BL parameters based on academic and empirical research

  - Delivery of SAA 2023 as an input to budgeting (iterative process until Oct 2022)

helvetia

Ihre Schweizer Versicherung

# Sally Roadmap: the Trip Ahead.

- Q4, 2022: knowledge transfer via talks on SAA methodology and experience gathered
  - Nov 2022: brown bag session – "spread the word across HV Asset Management"
  - The name "Sally" was given via electronic voting in the brown bag session

- Q1, 2023: Identified 22 Building Blocks to be added to Sally in the course of 2023
  - Insurance-specific constraints, e.g., Swiss Solvency Test
  - For example, treatment of illiquid assets (Real Estate), Scenario Analyser, Duration Analysis, Risk Decomposition (see next slide)

**helvetia** ◣

Ihre Schweizer Versicherung

# Risk Decomposition.

- Monthly Component VaR @ 99% Confidence

- In both portfolios, Liabilities (green block) are one of the main risk drivers

- Also FX_CHFEUR, largely offset by FW_CHFEUR



Component VaR in CHF

Component VaR

Current          Max. Return

■ AC_1  ■ AC_2  ■ AC_3  ■ AC_4  ■ AC_5  ■ AC_6  ■ AC_7  ■ AC_8  ■ AC_9  ■ AC_10
■ AC_11  ■ AC_12  ■ AC_13  ■ AC_14  ■ AC_15  ■ AC_16  ■ AC_17  ■ AC_18  ■ AC_19  ■ AC_20
■ AC_21  ■ AC_22  ■ AC_23  ■ Liabilities  ■ FX_CHFEUR  ■ FW_CHFEUR  ■ FX_CHFUSD  ■ FW_CHFUSD

# Typical Use Cases.

1) Balance Sheet Optimisation → Capital Efficiency!

2) Adding new Asset Classes (e.g., High Yield or Swiss Mortgages) to an existing portfolio

3) Suggest an allocation for a new investment strategy

4) Restructure an existing fund

helvetia
Ihre Schweizer Versicherung

# A Few Use Cases.

| | Done | | | In Progress |

| # | Who? | Purpose | Status |
|---|------|---------|--------|
| 1 | HV Group | Quantitative SAA 2023 as basis for discussion | ☺ |
| 2 | Pension Fund | Add Alternative Investments to fund | ☺ |
| 3 | SAA 2024 | Swiss Solvency Test Integration | 🚶 |
| 4 | HV Group | Add High Yield to existing B/S Asset Allocation | ☺ |
| 5 | HV Group | Analyse relative importance of High Yield vs. Equities | ☺ |
| 6 | Allegra Fund | Add Swiss Mortgages to Allegra fund | ☺ |

helvetia
Ihre Schweizer Versicherung

# Summary.

- We started in 2022 to build a tool to support our SAA

  - In the beginning, vision not clear

- We have self-implemented an SAA model suggested by Black/Litterman (1992)

  - Full control over the tool

- Along the implementation path, we had to make several decisions → valuable experience

  - Examples: how to treat FX, what is our SAA horizon (3Y, 5Y, 10Y)

- Learning: if we should have failed with our self-implementation, we still would have gathered experience on our journey and could have worked much more efficiently with a 3rd party vendor

- Sally useful for starting a dialogue with other departments / stakeholders

  - Sally has added value in client conversations

- Sally applied to several Use Cases

# Next Steps.

- More Use Cases?
  - "Spread the word"
  - Collect feedback → enhance Sally
- Step-by-step add 22 additional building blocks to Sally
  - For example, a backtesting engine, scenario analyser
  - Insurance-specific constraints: Liquidity, ESG, SST, S&P Capital Charge, …
- Fully integrate Sally in SAA process 2023/24

helvetia
Ihre Schweizer Versicherung

# References.

- Black, F., & Litterman, R. (1992). Global portfolio optimization. *Financial analysts journal*, *48*(5), 28-43.

- Brinson, G. P., Hood, L. R., & Beebower, G. L. (1986). Determinants of portfolio performance. Financial Analysts Journal, 42(4), 39-44.

- Huber, C. (2023). Asset Allocation Hands-On, with Examples in R. *Wilmott Magazine*, vol. 2023, iss. 124, 78–87.

helvetia

Ihre Schweizer Versicherung