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Confidential

Why having the right SAA is more important than ever

Particularly for sovereign institutions

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Reserve Management Seminar
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Section 1

Our objective

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Today's objectives

Ask yourself…

- What are the goals of your institution?
- What is the risk capacity of your institution?
- Are you making the best use of the risk analytics? Do you have enough support?
- Is there an independent team vetting strategic and tactical asset allocation?
- Is it time to review your strategic asset allocation?
- What is your investment philosophy for SAA and TAA?
- Are you positioned for trends in the mid- and long-term?

Section 2

Lessons from the Total Portfolio Approach

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Governance

Who is in charge?

- Traditionally, asset allocation is either decided by an external consultant or by agreement of the heads of fixed income and the head of equities
- This is inefficient because the consultant often provides a "canned solution" to all the clients, while the meeting of the heads of the asset classes leads to an arm-wrestling match where everyone tries to get more assets to manage—not in the best interest of the fund
- Total portfolio approach enthusiast require the existence of an asset allocation and risk team
- Functions of the asset allocation and risk team:
  - Capital market expectations
  - Reference portfolio selection
  - Strategic allocation selection
  - Diversification: analysis of factor exposures of all portfolio components
  - Decisions on tactical allocation and rebalancing

Objective definition

What are the goals?

Lots of overlap with the investment policy statement

An independent team in charge of establishing guidelines:

- Portfolio objective
- Reference portfolio
- Risk appetite
- Identify factors relevant to investment program and use them for portfolio construction and rebalancing

Factor exposure and use of the risk model

What is this substance?

- The main weakness of focusing on asset classes is that asset classes may have overlapping exposures to factors
- For example, commodities have exposure not only to commodity prices, but also to Australian and Canadian stocks, as well as Chilean bonds and many more assets
- A risk model helps look behind the scenes and "X-ray" the portfolio to see overlapping exposures to avoid unwanted concentration
- The risk team should therefore be involved in every step of portfolio management, and should not just be the bad cop that stops a portfolio manager when a limit gets breached
- Identify factor loadings for each investment

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Source: Wikipedia. Title: Sodium (Na) metal from the Dennis S.K. collection. Self made photo.

Factor expectations?

A weak point of this approach

- How do we optimize factor exposures unless we have capital market expectations at the factor level?
- Factors are difficult to quantify. Risk and correlation can be assessed from historical samples, but expected returns?

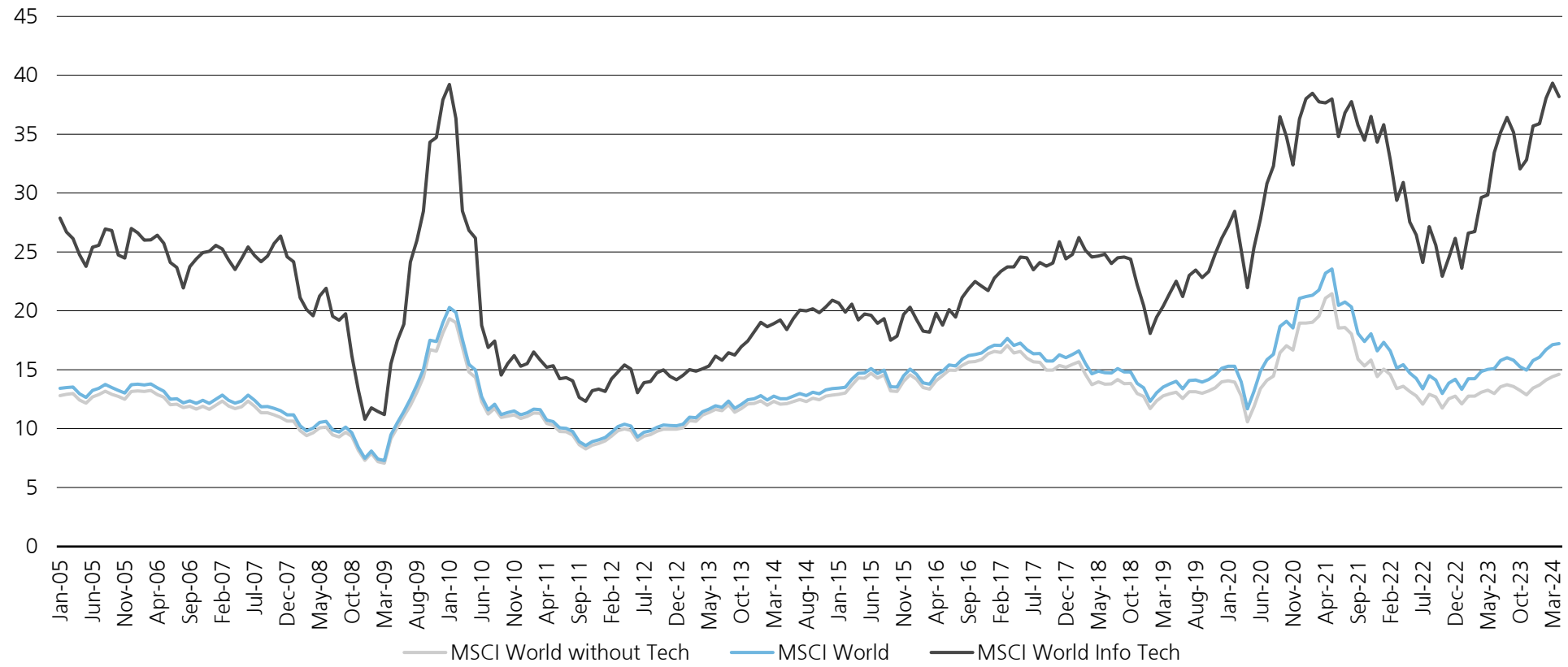
Section 3

The current situation

Equities: bimodal market

Information Technology is close to 1/4 of the MSCI World index capitalization, up from about 1/8 in 2017

MSCI World Trailing P/E with and without the Information Technology Sector

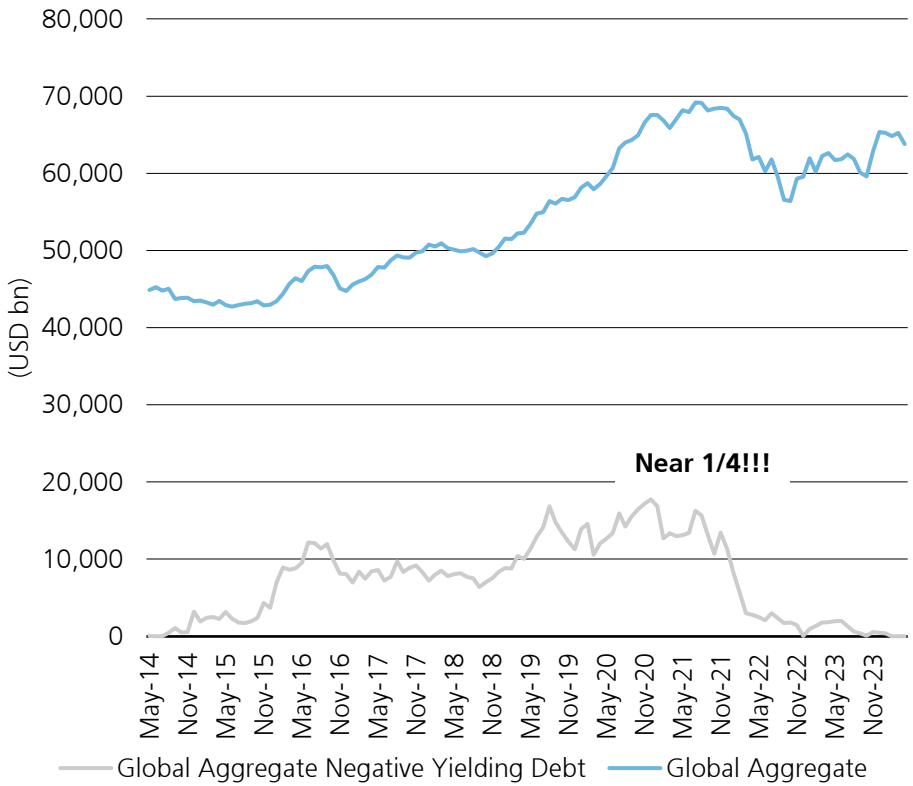


Source: MSCI via Rimes; UBS Asset Management. For illustration only. It is not possible to invest in indexes directly. Data as of 30 April 2024.

Fixed income: massive change in yields

Positive yields mean that investors do not pay to acquire diversification

Bloomberg Index Market Values
Global Aggregate vs. Global Aggregate Negative Yielding



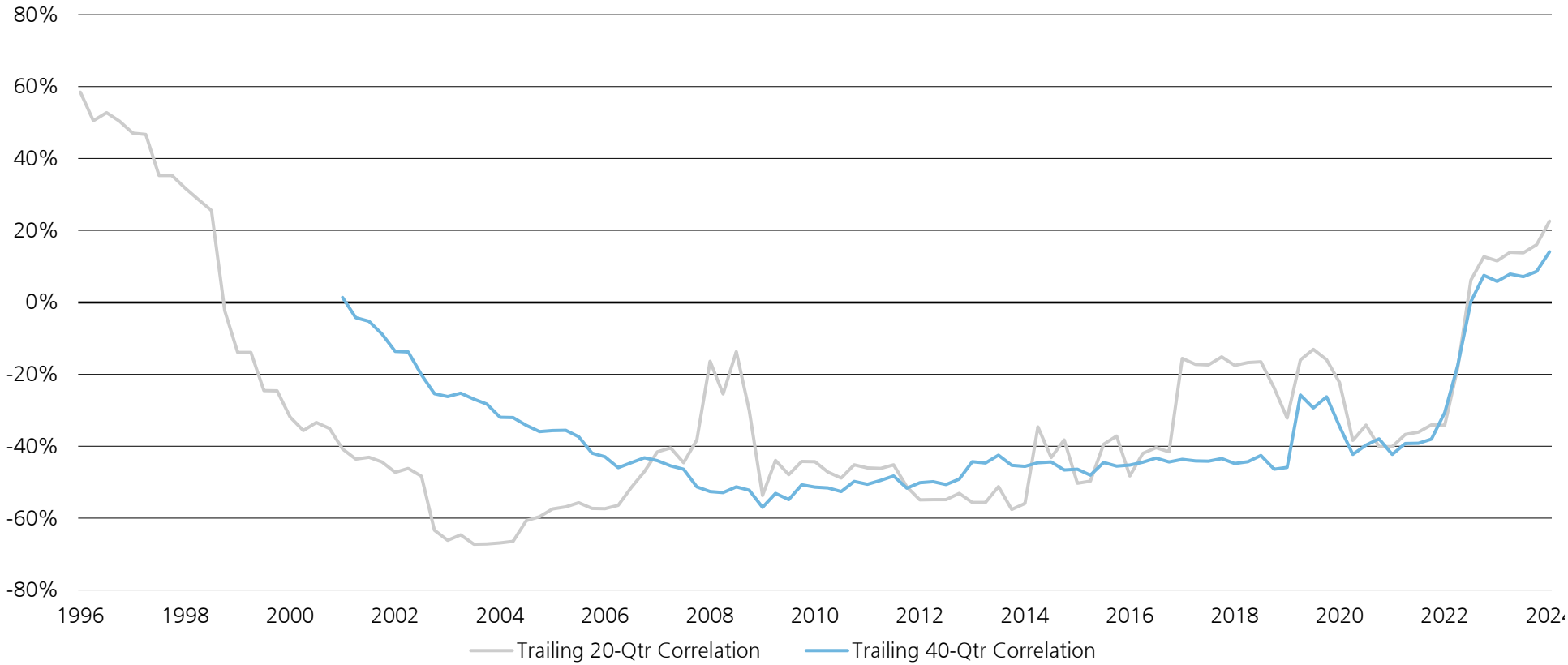
- In the 2015-2021 period, fixed-income investors faced zero or negative yields for most bonds
- Investors had to pay for diversification as if they were purchasing insurance
- A hunt for positive yields ensued
- Due to the fight against inflation, real (and not just nominal) rates are now positive
- This is good news for asset allocators

Source: Bloomberg, Barclays; UBS Asset Management. For illustration only. It is not possible to invest in indexes directly. Data as of 30 April 2024.

Stock-bond correlation

The numbers have been particularly volatile. Low or negative means better effects from diversification

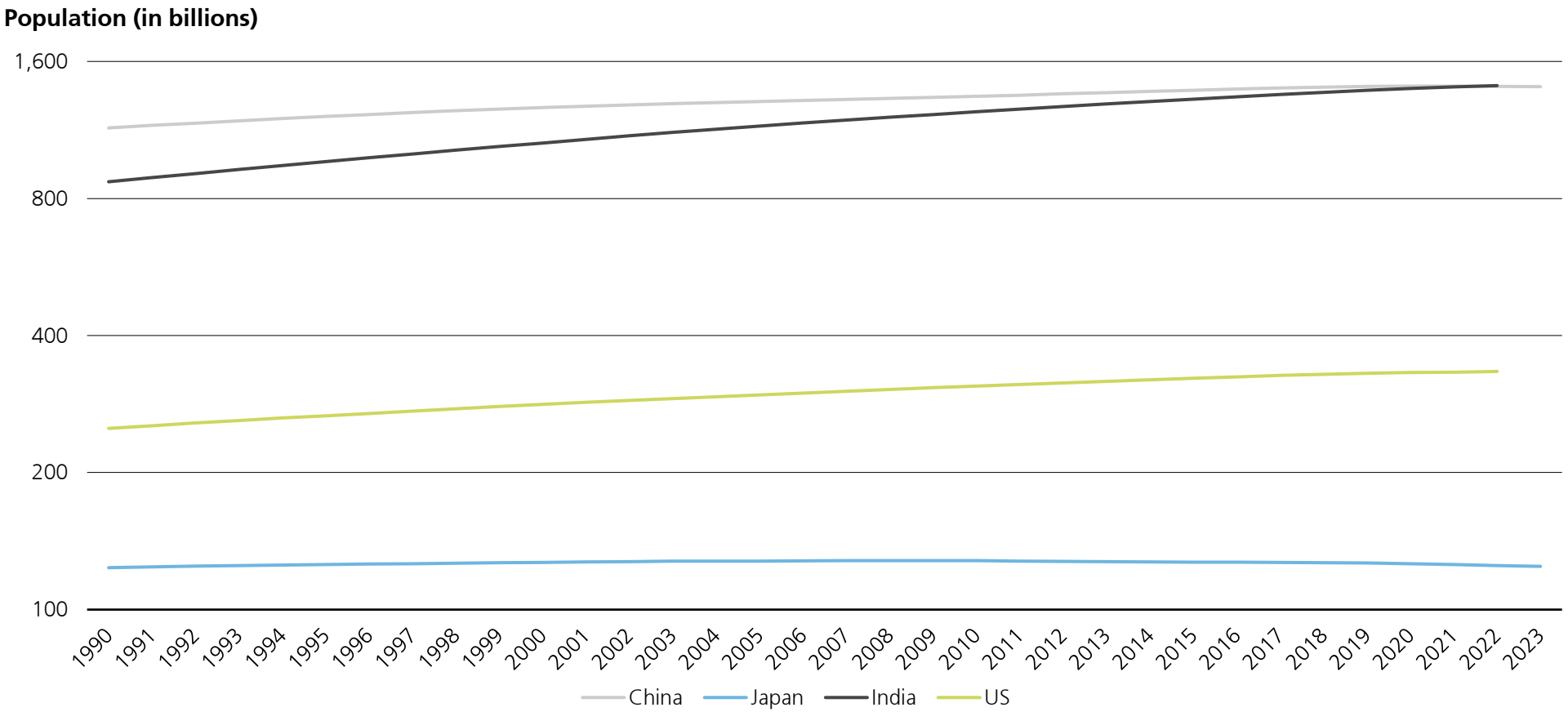
MSCI All-Country World Index (gross index, USD) and FTSE World Government Bond Index (total return, USD hedged) Correlation



Source: MSCI and FTSE via Rimes; UBS Asset Management. For illustration only. It is not possible to invest in indexes directly. Data as of 30 April 2024.

Demographics, technological change and interest rates

Solow growth model: growth = f(population growth, technology growth, capital assets growth)



Source: Refinitiv; UBS Asset Management. For illustration only. Data as of 30 April 2024.

Geopolitics and a changing world

Structural changes can be challenges and opportunities at the same time

The trend of globalization that started after the fall of the Berlin wall has slowed down

- Covid showed that extremely stretched supply lines are fragile
- Some localization, while inefficient in average times, is efficient in special times
- Tensions among the main world powers have increased

ESG and green innovation may lead to productivity growth

- A wave of investment and new ideas can grow world GDP
- While some technologies like self-driving vehicles are slower in emerging, others such as nuclear fusion may be closer than ever

Diversification is the first line of defense against uncertainty

Review your asset allocation in depth

- Asset diversification
- Factor diversification
- Better use or risk model
- Better use of diversifier and hedging asset classes

Does ESG increase or decrease risk?

Most ESG indexes have quite limited tracking error from their traditional counterparts

Last 10 Years (monthly data)	MSCI WORLD US $ - PRICE INDEX	MSCI WORLD ESG FOCUS $ - PRICE INDEX	MSCI WORLD ESG UNIVERSAL $ - PRICE INDEX	MSCI WORLD ESG LEADERS $ - PRICE INDEX	MSCI WORLD SRI $ - PRICE INDEX	S&P 500 COMPOSITE - PRICE INDEX	S&P 500 ESG $ - PRICE INDEX	S&P 500 EW ESG LEADERS SELECT $ - PRICE INDEX
Arith	8.4%	8.4%	8.6%	8.6%	9.0%	11.9%	12.6%	10.7%
Geom	7.2%	7.2%	7.4%	7.4%	7.8%	10.6%	11.3%	9.2%
Std Dev	15.0%	15.2%	14.9%	14.9%	15.1%	15.3%	15.3%	16.6%
Skew	-0.32	-0.30	-0.31	-0.29	-0.20	-0.37	-0.36	-0.33
Kurt	0.74	0.61	0.53	0.56	0.33	0.54	0.41	1.06
Worst Month	-13.5%	-13.0%	-12.8%	-13.0%	-11.1%	-12.5%	-11.6%	-16.6%
TE from Traditional		0.70%	0.76%	1.36%	2.63%		1.12%	4.67%
Percentile 1	-9.3%	-9.5%	-9.5%	-9.1%	-9.4%	-9.3%	-9.6%	-10.0%
Percentile 2	-8.7%	-8.6%	-8.5%	-8.1%	-8.8%	-9.0%	-9.2%	-9.4%
Percentile 3	-8.5%	-8.4%	-8.2%	-8.1%	-8.0%	-8.6%	-8.7%	-8.6%
Percentile 4	-7.9%	-8.1%	-7.7%	-7.7%	-7.6%	-8.4%	-8.2%	-7.7%
Percentile 5	-7.4%	-8.0%	-7.5%	-7.5%	-7.6%	-7.0%	-6.8%	-7.3%
Conditional VaR	-8.4%	-8.5%	-8.3%	-8.1%	-8.3%	-8.5%	-8.5%	-8.6%

Source: MSCI and S&P via Refinitiv; UBS Asset Management. For illustration only. It is not possible to invest in indexes directly. Data as of 31 May 2024. It is not possible to invest in indexes directly.

Section 4

Forecasts

Historical backdrop

The past two decades

The last 20 years fit the fundamental relationship of risk and return quite well.

- Equities highest return and risk
- Cash lowest return and risk
- Bond have expected relationships
  - Credit has higher return and risk than government bonds
- Sharpe Ratios have been above 0.45

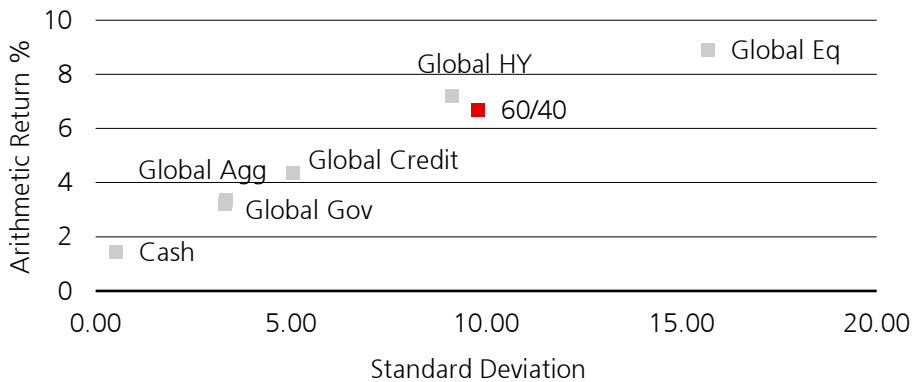
We defined the Global 60/40 portfolio as:

- 60% Global Equities unhedged
- 40% Global Aggregate Bond hedged
- Over the last 20 years it has had a 6.4% nominal return and 3.8% in real return in USD terms

Performance Summary: 20 years through May 2024
USD Perspective

	Geometric Return	Arithmetic Return	Standard Deviation	Sharpe Ratio
Global Equities	7.9	8.9	15.7	0.48
Global HY	7.0	7.2	9.1	0.63
Global Government	3.2	3.2	3.3	0.53
Global IG Credit	4.3	4.3	5.1	0.57
Global Agg	3.4	3.4	3.3	0.58
US Cash	1.4	1.4	0.5	0.00
Inflation	2.6	2.5	1.4	--
60/40 Portfolio	6.4	6.7	9.8	0.54

Historical Return and Risk: 20 years through May 2024
USD Perspective



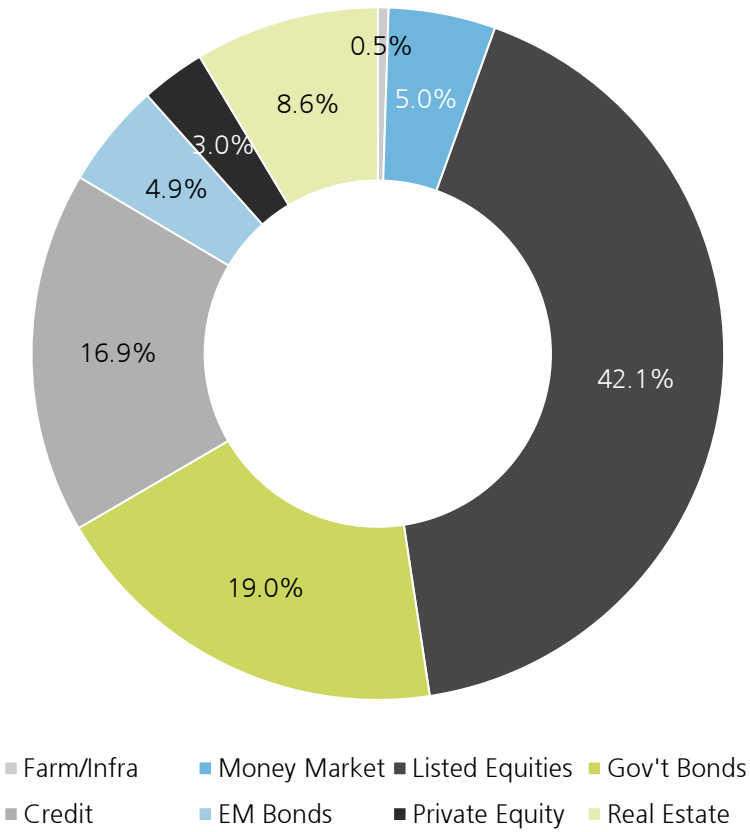
For illustration purpose only. Past performance is no guarantee of future results. It is not possible to invest in indexes directly. Sample: 2004:05-2024:05. The analysis above is based on monthly data: Global Eq (MSCI ACQI NR USD), Global HY (Bloomberg Global High Yield TR Hdg USD), Global Gov (Bloomberg Global Credit TR Hdg USD), Global Credit (Bloomberg Global Treasury TR Hdg USD), Global Agg (Bloomberg Global Aggregate TR Hdg USD), Cash (FTSE Treasury Bill 1 Mon USD), and inflation (A SBBI US Inflation).

The global investable market

Defining Asset Classes

- Mutually exclusive: The same investment cannot be included in more than one asset class
- Span: Must cover all investable assets
- Hedge funds, ETFs, mutual funds, and derivative instruments are not an asset class as they include long and short positions within asset classes

- Latest global investable total: USD 172 trillion
- Cyclically adjusted investable market total: USD 155 trillion



Source: UBS Asset Management.
Note: For illustration purpose only. Data as of December 2023 or latest available. Data unaudited and may be revised by index providers.

It’s a matter of (time) perspective

Three linked but different sets of asset class views: Equilibrium, Baseline and Tactical

Equilibrium expectations
An average over the next 40 or 50 years

Reflect our views for a broad set of asset classes in a long-term, ideal equilibrium setting

Baseline expectations
The next 5 to 10 years

Take equilibrium views and incorporate current market conditions with an intermediate time horizon

Tactical views

Set tactical asset allocation views in portfolios. Used to determine over- and under-weights around SAA.

Note: For illustration purpose only

Capital market assumptions

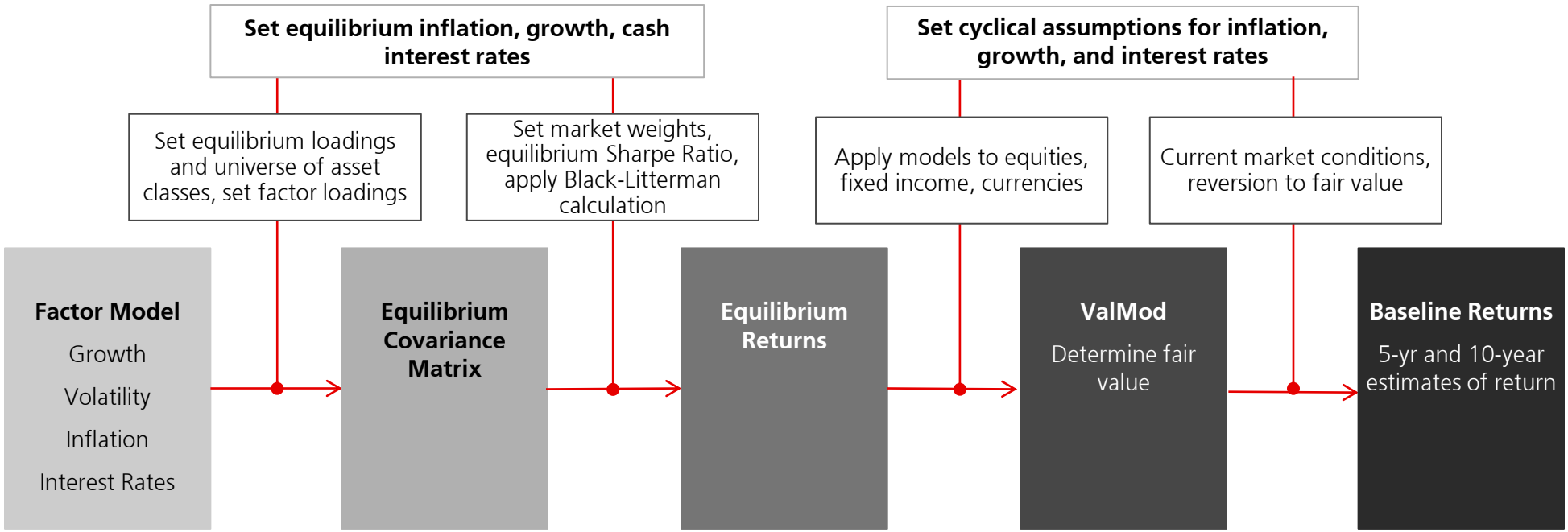
Our process: an integrated approach across Equilibrium CME, ValMod and Baseline Returns

Three models support the CME process:

- Equilibrium CME: a 'neutral' view of pricing
- ValMod: valuation-based model of market pricing
  - Residual income approach
- Baseline: 5-yr and 10-yr assumptions

In Baseline, we support:

- 400 asset classes
- 36 currencies



Note: For illustration purpose only

Expected equity returns

Overall, we view equities as slightly overvalued and expect real returns below their historic averages.

The United States

- Most overvalued
- USD is overvalued and is a significant component of expected return
- Positive for USD investors: expect non-US equity markets to have a boost due to currencies in a global equities portfolio
- Negative for most non-USD investors: on average, they can expect a drag on performance due to dollar depreciation

Japan

- Continues to be an outlier

5-yr Baseline Equity Decomposition
31 May 2024

Market	Inflation	Real Growth	Dividends	Valuation	Nominal Returns	Real Local Return
AU Eq	2.7%	2.1%	3.9%	-0.8%	8.0%	5.2%
CA Eq	2.1%	3.1%	3.0%	-0.9%	7.5%	5.3%
CH Eq	1.1%	2.6%	3.0%	-0.7%	6.2%	5.0%
CN Eq	1.3%	3.2%	2.6%	0.3%	7.6%	6.2%
DE Eq	2.1%	2.7%	3.1%	0.1%	8.2%	6.0%
GB Eq	2.2%	1.2%	3.6%	-0.8%	6.4%	4.0%
JP Eq	2.0%	4.9%	2.1%	0.0%	9.2%	7.0%
US Lcap Eq	2.6%	2.9%	1.6%	-3.8%	3.2%	0.6%

Returns from different currency perspectives
31 May 2024

Market	Local	USD	EUR	CHF	GBP	JPY	CNY	AUD	CAD
AU Eq	8.0%	9.0%	7.0%	7.1%	6.9%	0.5%	6.9%	8.0%	7.5%
CA Eq	7.5%	9.1%	7.1%	7.2%	7.0%	0.6%	7.0%	8.1%	7.5%
CH Eq	6.2%	8.0%	6.0%	6.2%	6.0%	-0.4%	5.9%	7.0%	6.5%
CN Eq	7.6%	9.7%	7.7%	7.8%	7.7%	1.2%	7.6%	8.7%	8.2%
DE Eq	8.2%	10.2%	8.2%	8.3%	8.1%	1.6%	8.1%	9.2%	8.7%
GB Eq	6.4%	9.4%	6.4%	6.5%	6.4%	0.0%	6.3%	7.4%	6.9%
JP Eq	92%	18.4%	16.3%	16.4%	16.2%	9.2%	16.2%	17.4%	16.8%
US Lcap Eq	3.2%	3.2%	1.4%	1.5%	1.3%	-4.8%	1.3%	2.3%	1.8%

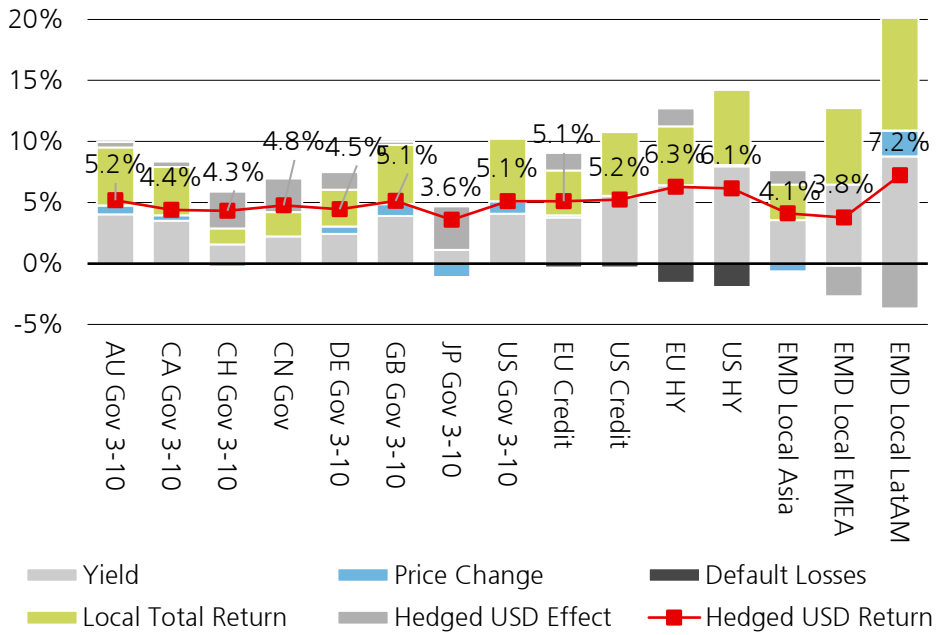
Source: UBS Asset Management. The forecast are presented for illustrative purposes only, are developed with the benefit of hindsight and have inherent limitations as the results are based on historical analyses and numerous assumptions. The results do not represent actual trading using client assets and are not based on the results of any actual strategy managed by UBS Asset Management. The results may not reflect the impact of economic and market factors might have had on UBS Asset Management's decision making if actual client assets were managed during the time periods portrayed. The results are not an indication, assurance, estimate or forecast of future results. Our model inputs are subject to change at any time without notice. Data as of May 2024.

Expected fixed income returns

The continued rise in interest rates in 2024 has dramatically changes our interest rate outlook

- Real yields have shifted from negative to positive
- Yields are now generally in the fair-value range
- Government cyclical yield assumptions revised upwards

5-yr Baseline fixed income decomposition



5-yr Baseline Fixed Income Decomposition

31 May 2024

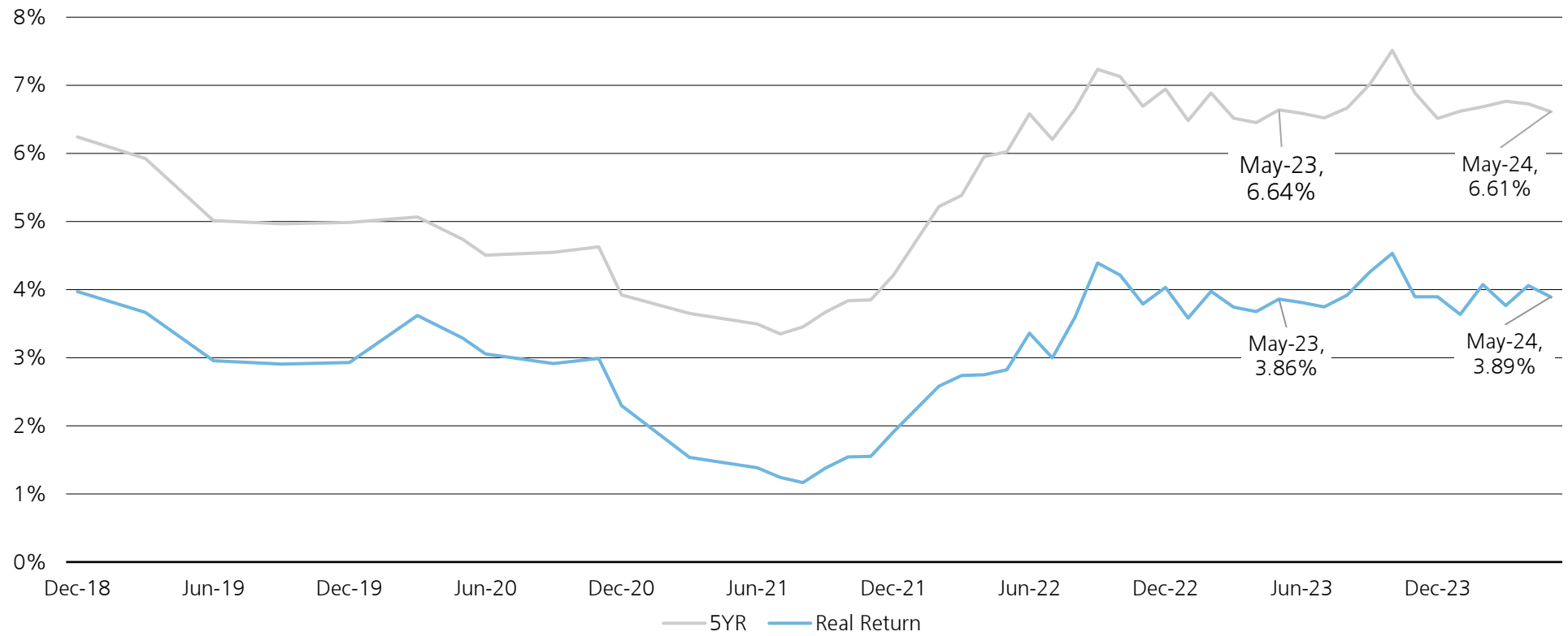
	Yield	Price Change	Default Losses	Local Total Return	Hedged USD Effect	Hedged USD Return
AU Gov 3-10	4.0%	0.7%	0.0%	4.8%	0.4%	5.2%
CA Gov 3-10	3.5%	0.5%	0.0%	4.0%	0.4%	4.4%
CH Gov 3-10	1.6%	-0.3%	0.0%	1.3%	3.0%	4.3%
CN Gov	2.2%	-0.2%	0.0%	2.0%	2.7%	4.8%
DE Gov 3-10	2.4%	0.6%	0.0%	3.0%	1.4%	4.5%
GB Gov 3-10	3.9%	1.0%	0.0%	4.9%	0.3%	5.1%
JP Gov 3-10	1.1%	-1.1%	0.0%	0.0%	3.6%	3.6%
US Gov 3-10	4.1%	1.0%	0.0%	5.1%	0.0%	5.1%
EU Credit	3.8%	0.2%	-0.3%	3.7%	1.4%	5.1%
US Credit	5.5%	0.0%	-0.3%	5.2%	0.0%	5.2%
EU HY	6.4%	0.0%	-1.6%	4.8%	1.5%	6.3%
US HY	8.0%	0.1%	-1.9%	6.1%	0.0%	6.1%
EMD Local Asia	3.6%	-0.7%	0.0%	2.9%	1.2%	4.1%
EMD Local EMEA	6.5%	-0.2%	0.0%	6.3%	-2.5%	3.8%
EMD Local LatAM	8.8%	2.1%	0.0%	10.9%	-3.7%	7.2%

Source: UBS Asset Management. The forecast are presented for illustrative purposes only, are developed with the benefit of hindsight and have inherent limitations as the results are based on historical analyses and numerous assumptions. The results do not represent actual trading using client assets and are not based on the results of any actual strategy managed by UBS Asset Management. The results may not reflect the impact of economic and market factors might have had on UBS Asset Management's decision making if actual client assets were managed during the time periods portrayed. The results are not an indication, assurance, estimate or forecast of future results. Our model inputs are subject to change at any time without notice. Data as of May 2024.

The Global 60/40 portfolio

The Global 60/40 portfolio's 5-yr expected return (USD) is 3 basis points lower than in May 2023. The real return was only up 3 basis points over the same period.

Evolution of our 60/40 portfolio expected returns (USD)



Source: UBS Asset Management. The Global 60/40 is comprised of 60% Global Equity (USD, unhedged) and 40% Global Aggregate (USD, hedged). The forecast are presented for illustrative purposes only, are developed with the benefit of hindsight and have inherent limitations as the results are based on historical analyses and numerous assumptions. The results do not represent actual trading using client assets and are not based on the results of any actual strategy managed by UBS Asset Management. The results may not reflect the impact of economic and market factors might have had on UBS Asset Management's decision making if actual client assets were managed during the time periods portrayed. The results are not an indication, assurance, estimate or forecast of future results. Our model inputs are subject to change at any time without notice. Data as of May 2024.

Alternatives

We model private alternatives based on economic risks, not appraised value volatility

We believe that alternatives can be highly beneficial to providing additional diversification to investors

Real Estate	• For unlevered real estate, we expect about 5% to 6% nominal returns net of fees • Levered core funds should return 5% to 6% in nominal terms net of fees
Private Equity	• Continued premiums of 2% to 3% above equities • Higher leverage costs but high listed equity valuations, leading to IPO opportunities
Infrastructure	• Very difficult asset class to assess. Equity partnerships are longer (10 to 15 years). • Equity Infrastructure return usually between real estate and equities: 5.3% • Debt Infrastructure similar to HY: 4.8%
Hedge Funds	• Returns in the 6% to 8% range • For a diversified portfolio, volatility around bonds (5% to 7%)
Private Credit	• Returns around 5%, based on a combination of US HY and Bank Loan estimates
Commodities	• We set the geometric return to be equal to US cash over the longer time horizon • The arithmetic return is much higher due to volatility • Strong correlation with equities and inflation

Source: UBS Asset Management. Given that no established market benchmarks exist for all alternative asset classes, and that it is not possible to buy an index fund providing a fully diversified investment, we provide these estimates thinking of a hypothetical investor having shares in a variety of partnerships of average quality. The forecast are presented for illustrative purposes only, are developed with the benefit of hindsight and have inherent limitations as the results are based on historical analyses and numerous assumptions. The results do not represent actual trading using client assets and are not based on the results of any actual strategy managed by UBS Asset Management. The results may not reflect the impact of economic and market factors might have had on UBS Asset Management's decision making if actual client assets were managed during the time periods portrayed. The results are not an indication, assurance, estimate or forecast of future results. Our model inputs are subject to change at any time without notice. Data as of May 2024.

Economic scenarios – overview

Our basic economic scenarios can be explained through combinations of growth and inflation

Our Baseline scenario is but one of many possible paths of the capital markets

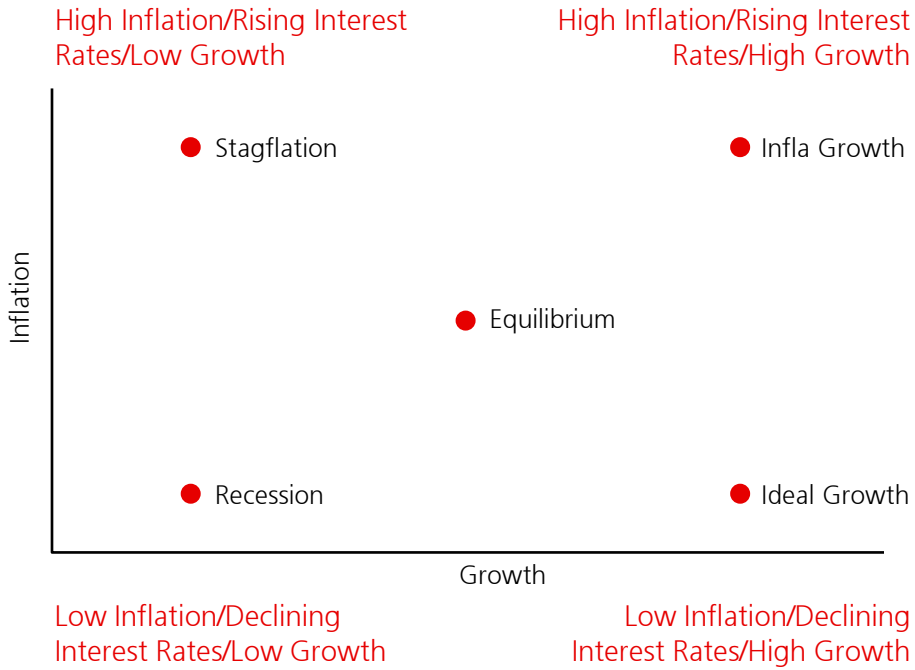
Basic Regimes

- Equilibrium
- Recession: low inflation, low growth
- Stagflation: high inflation, low growth
- Ideal Growth: low inflation, high growth
- Inflationary Growth: high inflation, high growth

Other Regimes

- Hawkish Stagflation: aggressive Central Bank reaction to fight inflation
- Dovish Stagflation: cautious Central Bank reaction to stimulate growth
- Currency Crisis: acceleration of local inflation and interest rates

Macroeconomic scenario matrix



Note: For illustration purpose only

Economic scenarios

Looking at results

	Baseline	Recession	Stagflation	Ideal Growth	Growth Inflation
Inflation (2yr average)	3.1%	0.9%	5.5%	2.0%	5.5%
Cash Rate (2yr average)	5.3%	3.9%	5.9%	5.2%	5.9%
Equity Economic Growth (1yr)	3.0%	-15.0%	-10.0%	4.0%	3.0%

Nominal returns 5yr GRR		Starting yield	Baseline	Recession	Stagflation	Ideal Growth	Growth Inflation
Cash	Cash	5.4%	4.4%	2.0%	6.4%	4.2%	6.6%
Fixed Income	Global Gov Bonds Hedged	3.4%	4.7%	3.0%	6.4%	4.8%	6.8%
	Global Corp Bonds Hedged	5.1%	5.2%	3.9%	7.1%	4.8%	7.3%
Equity	Global Equity Unhedged		7.3%	-2.8%	4.1%	6.6%	10.5%

Real returns		Baseline	Recession	Stagflation	Ideal Growth	Growth Inflation
Cash	Cash	1.7%	0.8%	0.6%	2.5%	0.8%
Fixed Income	Global Gov Bonds Hedged	4.7%	3.0%	6.4%	4.8%	6.8%
	Global Corp Bonds Hedged	5.2%	3.9%	7.1%	4.8%	7.3%
Equity	Global Equity Unhedged	4.6%	-4.0%	-1.6%	4.8%	4.4%

In USD terms. For illustration purpose only. Data as of May 31, 2024.

Risk and correlations within scenarios

Our scenarios are about more than modeling returns, we consider the risk and correlations as well

Stock-Bond Correlation

- Negative correlation should:
  - Reduce total volatility
  - Earn higher geometric returns
- Stagflations will add to volatility, and in turn hurt geometric returns

Risk-off Events

- Typically have two big changes:
  - Volatility of risky asset classes increases
  - Correlation across risky asset classes increases
- Benefits of diversification across risky assets is decreased in these situations

Scenario	Stock-Government Bond Correlation	Risk Volatility	Risk Correlation
Equilibrium	Slightly Positive	Average	Average
Recession	Negative	Above Average	Above Average
Stagflation	Positive	Above Average	Above Average
Ideal Growth	Slightly Positive	Below Average	Below Average
Inflationary Growth	Slightly Negative	Average	Below Average
Base Case	Slightly Positive	Average	Average

Note: For illustration purpose only

Section 5

Conclusion and disclosures

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Conclusion

Your homework

- What are the goals of your institution?
- What is the risk capacity of your institution?
- Are you making the best use of the risk analytics? Do you have enough support?
- Is there an independent team vetting strategic and tactical asset allocation?
- Is it time to review your strategic asset allocation?
- What is your investment philosophy for SAA and TAA?
- Are you positioned for trends in the mid- and long-term?

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