

Efficient Hedging

Hélène Veltman, PhD

Vice President, Investment Strategist and Research
State Street Global Advisors

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Agenda

Market Environment

Equity Hedging

- Case study 1: Options
 - Case study 2: Volatility Control
 - Case study 3: Low volatility Equity
-

Summary Remarks

Appendices:

A) Important Disclosures

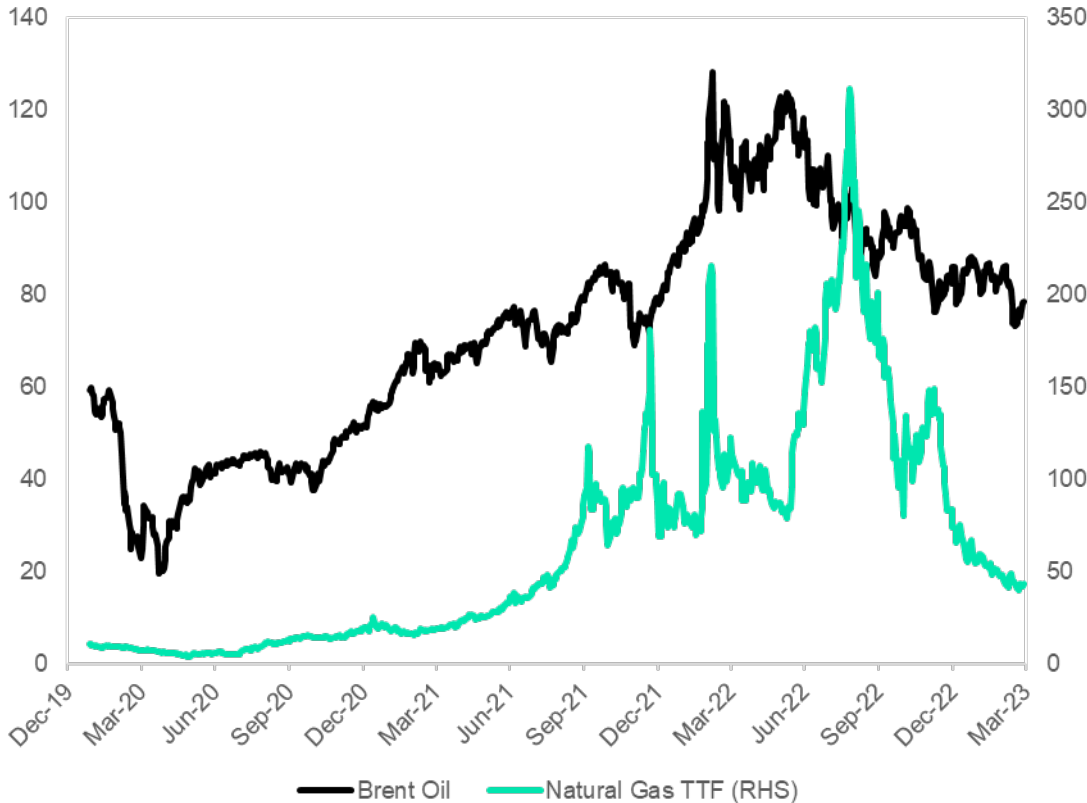
B) Biography

The information contained in this document is current as of the date presented unless otherwise noted.

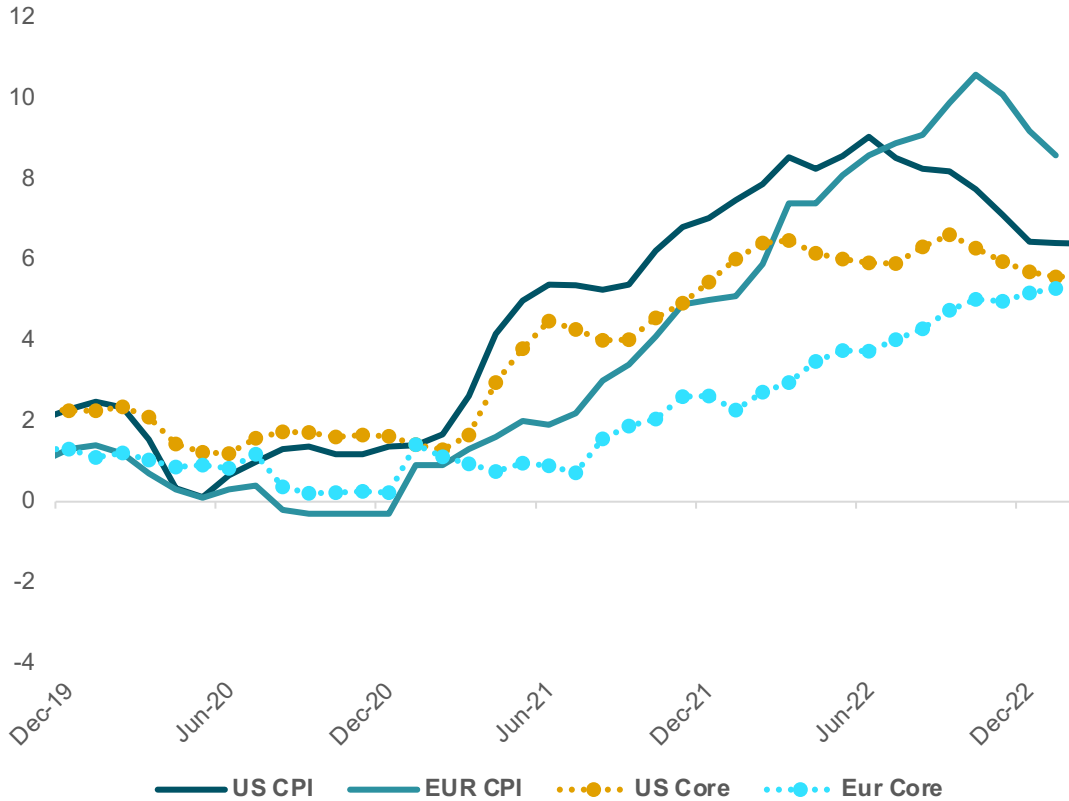
Market Environment

Inflation Worries

Oil and Gas



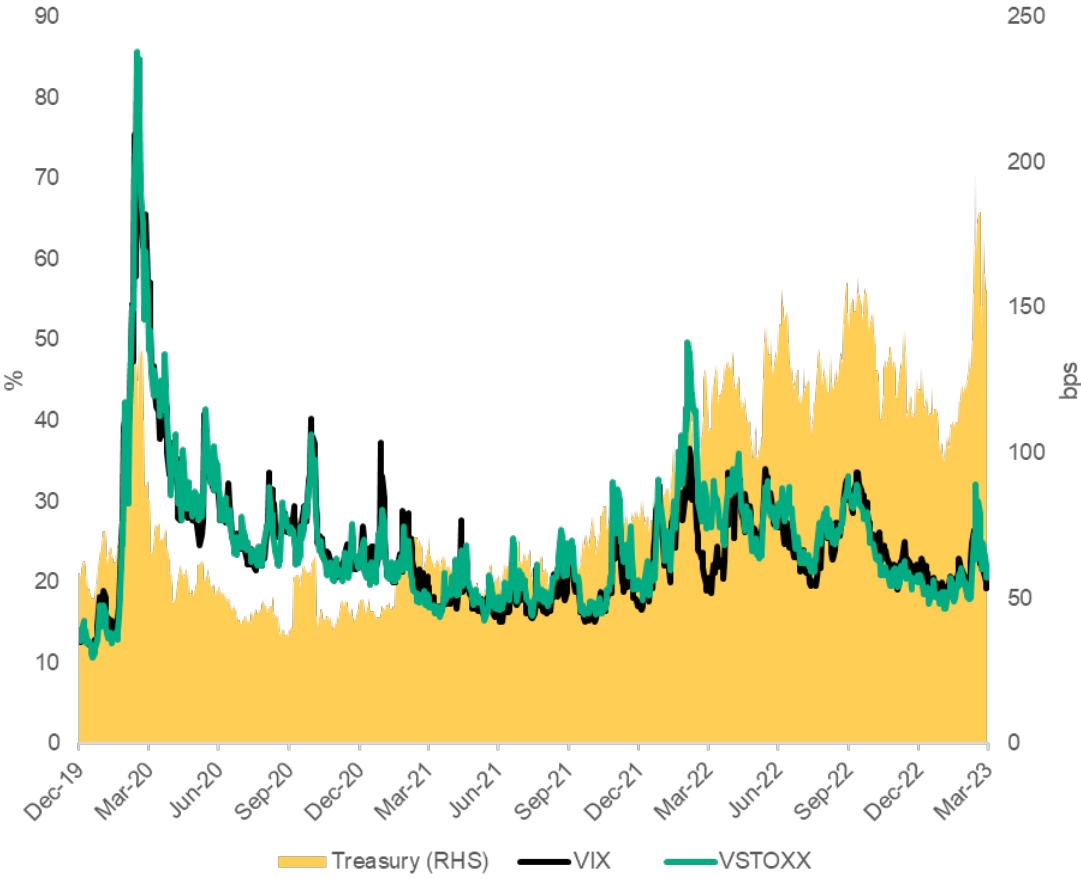
Headline and Core Inflation YOY change



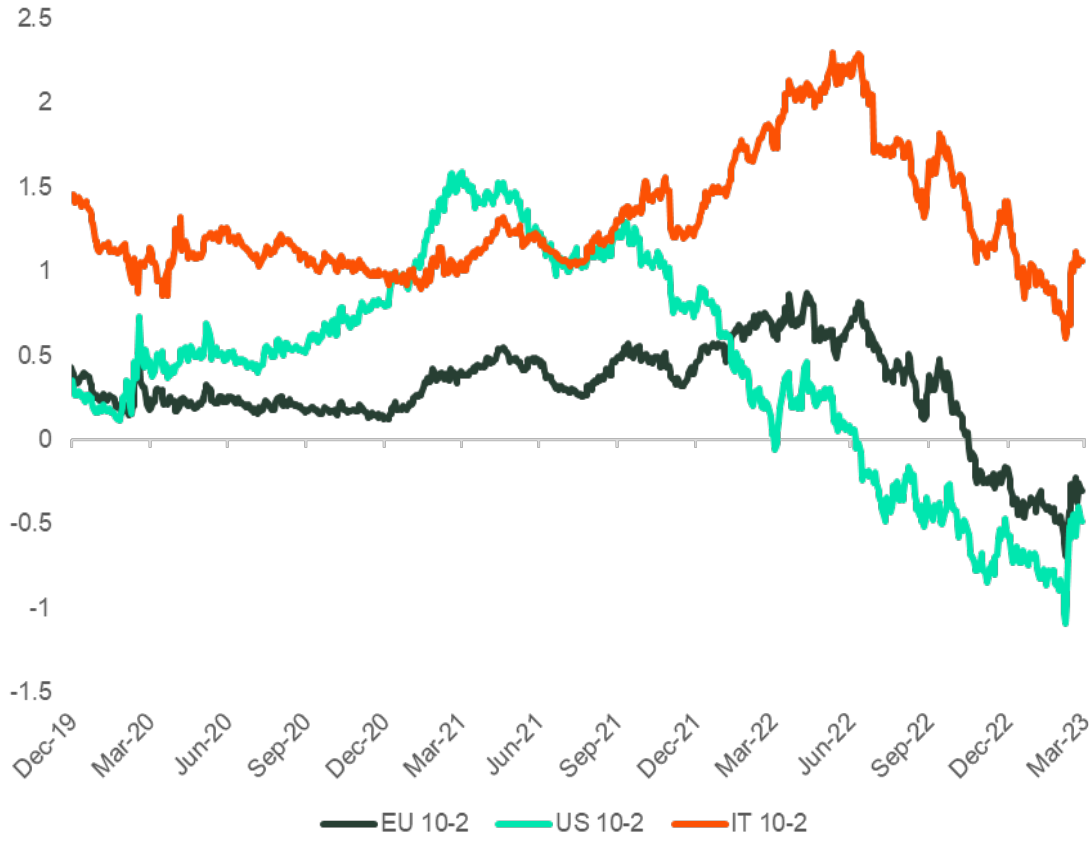
Source: SSGA and Refinitiv as of 24 March 2023.

Market Uncertainty

Equity and Treasury Implied Volatility

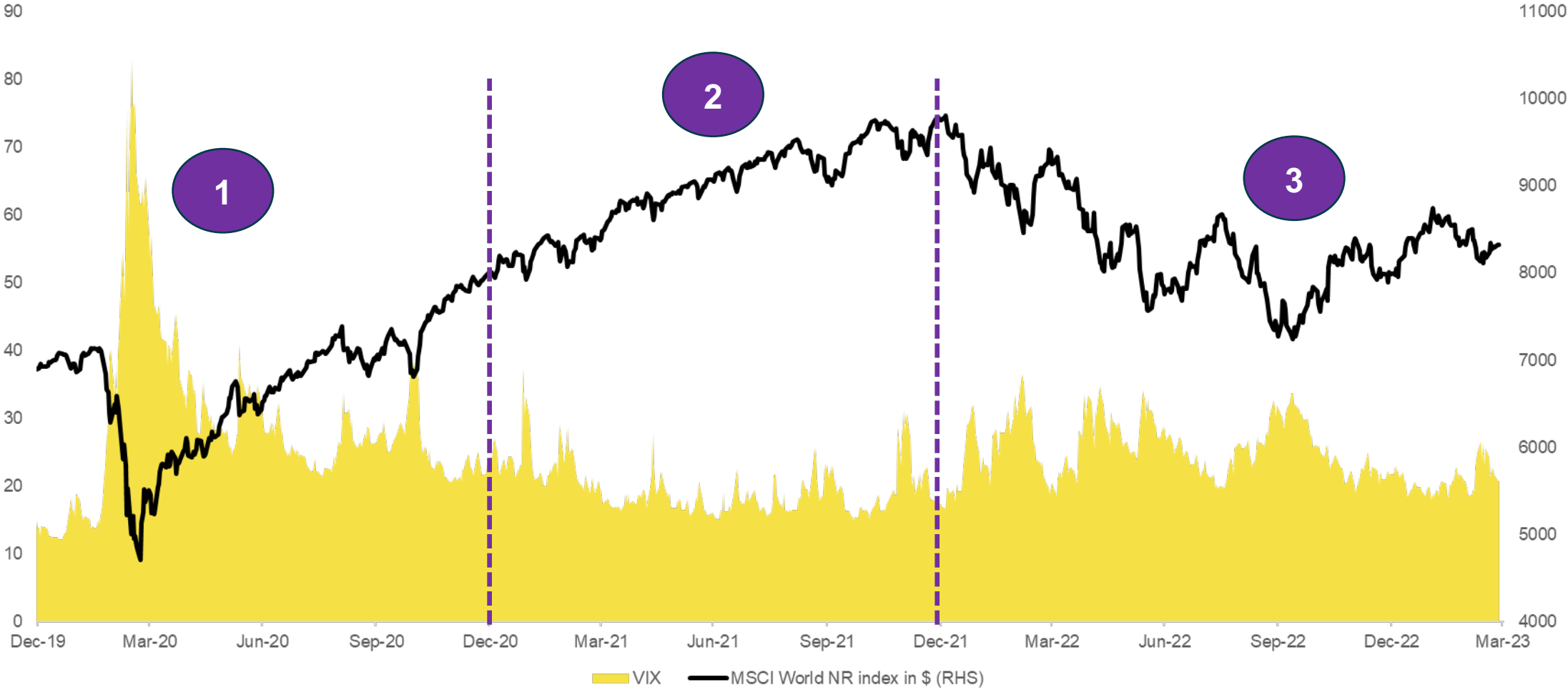


The 10 year – 2 year government bond yield spread



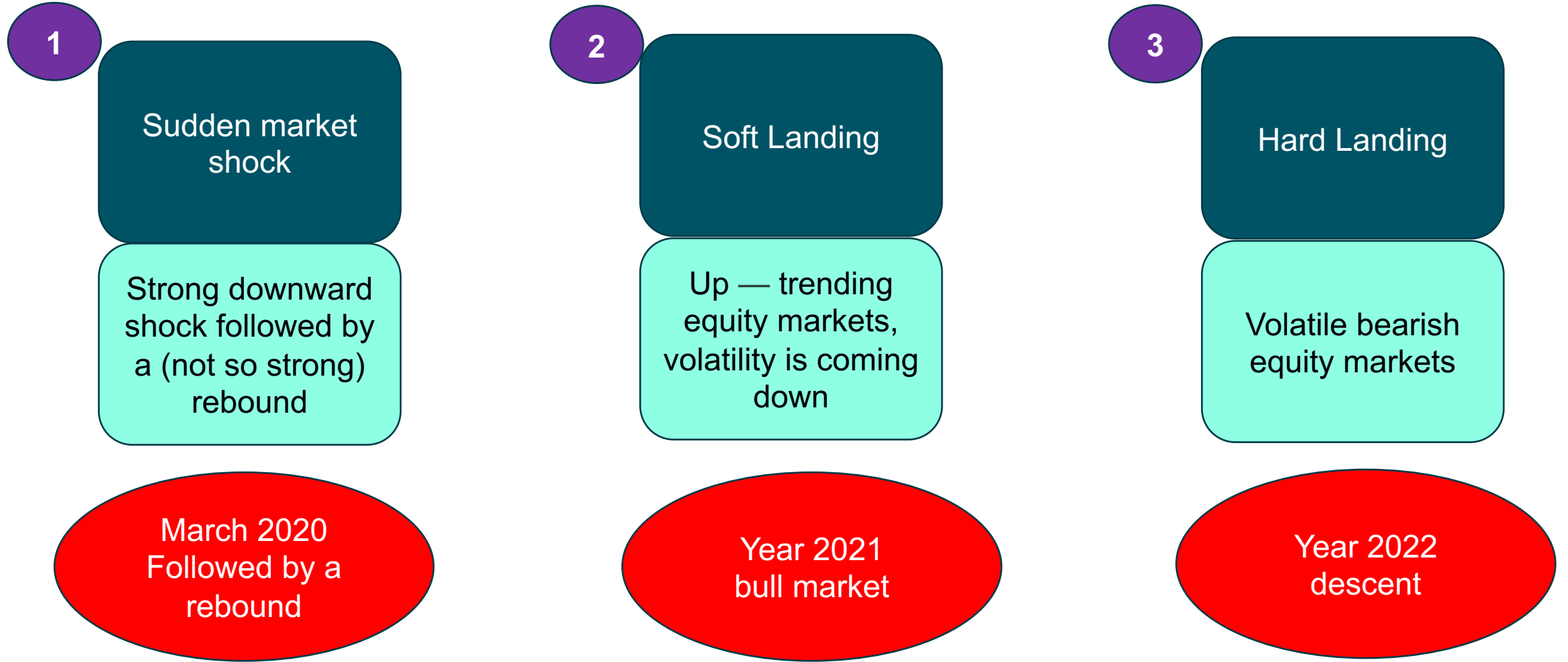
Source: SSGA, Bloomberg and Refinitiv as of 24 March 2023.

We have seen Different Market Regimes since 2019



Source: SSGA and Refinitiv as of 24 March 2023.

Three Possible Market Scenarios for 2023

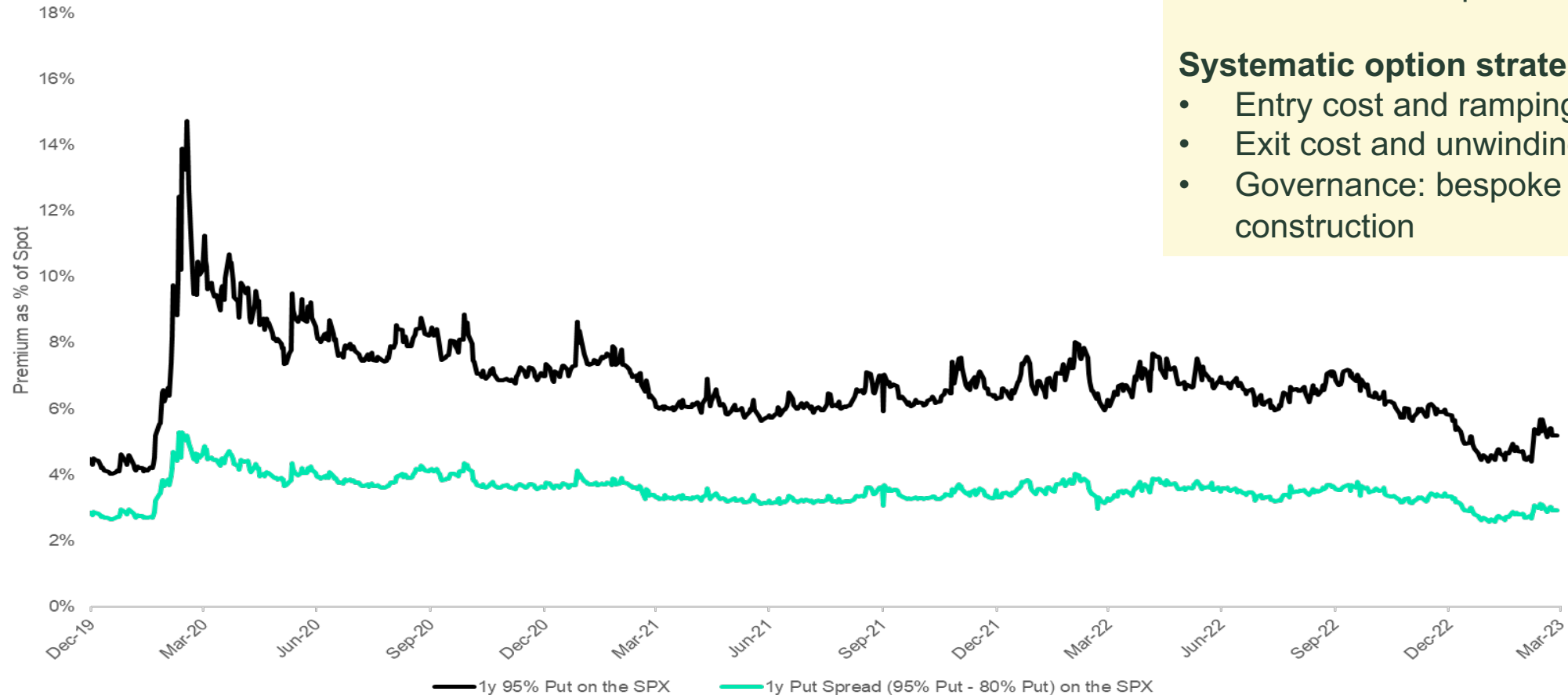


Source: SSGA as of 24 March 2023.

Equity Hedging

Case Study 1: Options

Option Premium



Options can be complex

- Option cost
- Market timing
- Premium reduction through a combination of puts and calls

Systematic option strategy

- Entry cost and ramping up
- Exit cost and unwinding
- Governance: bespoke index construction

Source: SSGA and Bloomberg as of 24 March 2023.

Case Study 1: Options (continued)

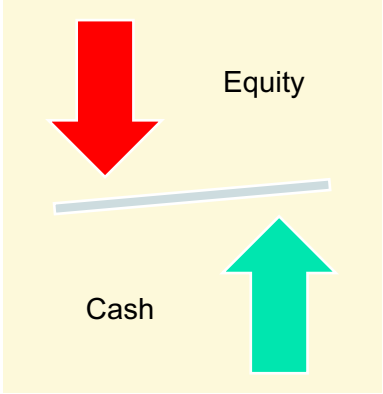
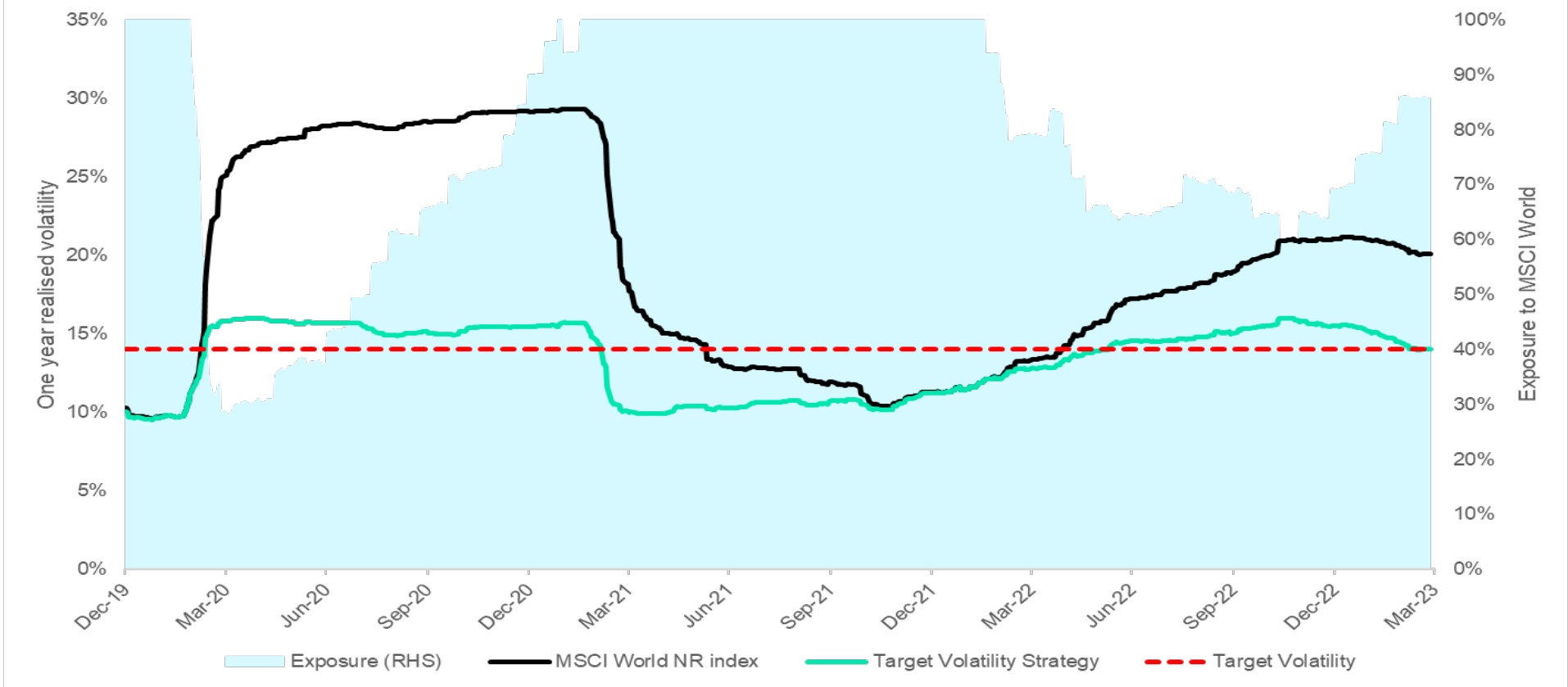
- | | | |
|---|---------------------|---|
| 1 | Sudden market shock | <ul style="list-style-type: none">• Strong outperformance if entered before the meltdown (so low premium)• Best drawdown reduction (at the level of the predefined strike)• Even if kept after the rebound, the hedged equity has a dampened volatility |
| 2 | Soft landing | <ul style="list-style-type: none">• Loss of premium• Unlimited loss if the strategy includes a short call |
| 3 | Hard landing | <ul style="list-style-type: none">• Simple put is perhaps too expensive• Put spread or collar can be a compromise |

Source: SSGA, as of 24 March 2023.

Case Study 2: Volatility Control

De — risk into cash — like asset when equity volatility rises above a target volatility level

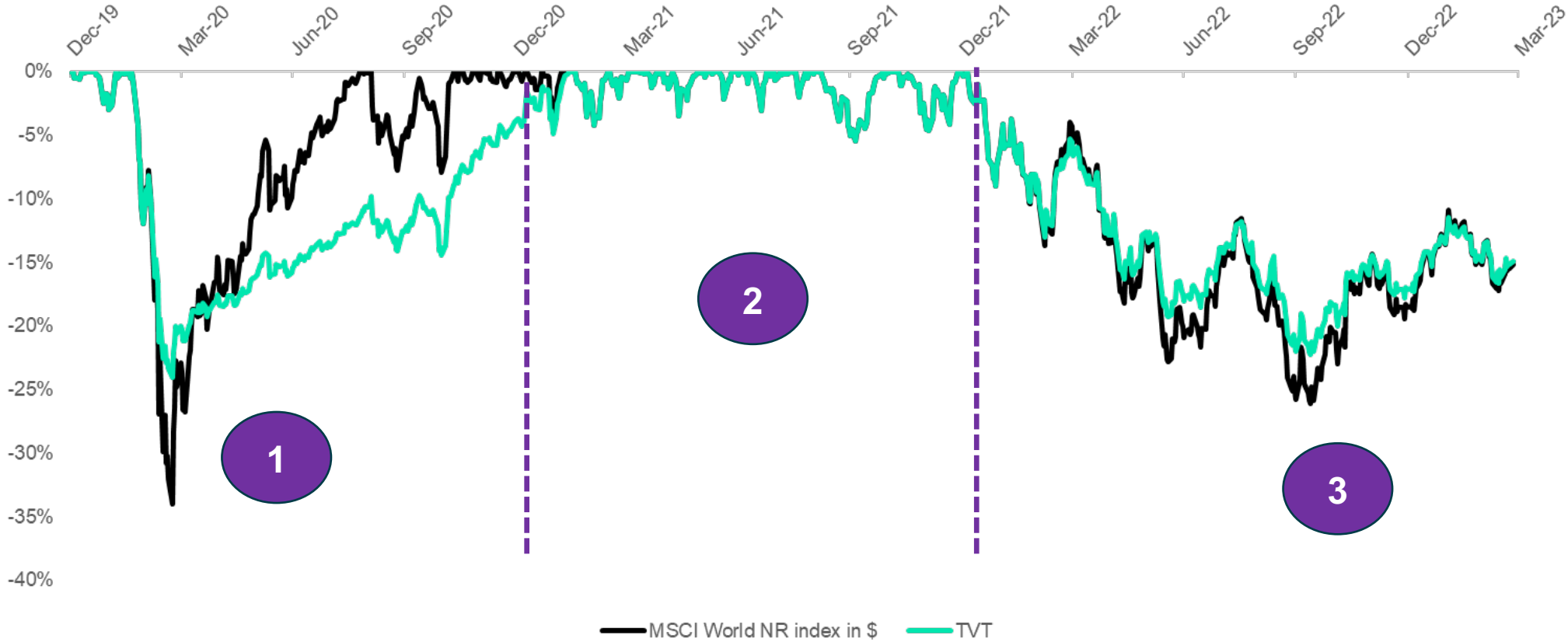
Realised 1y volatility



Source: SSGA and Refinitiv as of 24 March 2023.

Case Study 2: Volatility Control (continued)

Drawdown



Source: SSGA, as of 14 February 2023.

Case Study 2: Volatility Control (continued)

- 1 Sudden market shock**
 - Good drawdown reduction during the market crash
 - Cash drag on the rebound
- 2 Soft landing**

When the volatility is low the exposure to the equity will be high, therefore not too much cash drag
- 3 Hard landing**

Cash drag limited as equity underperforms

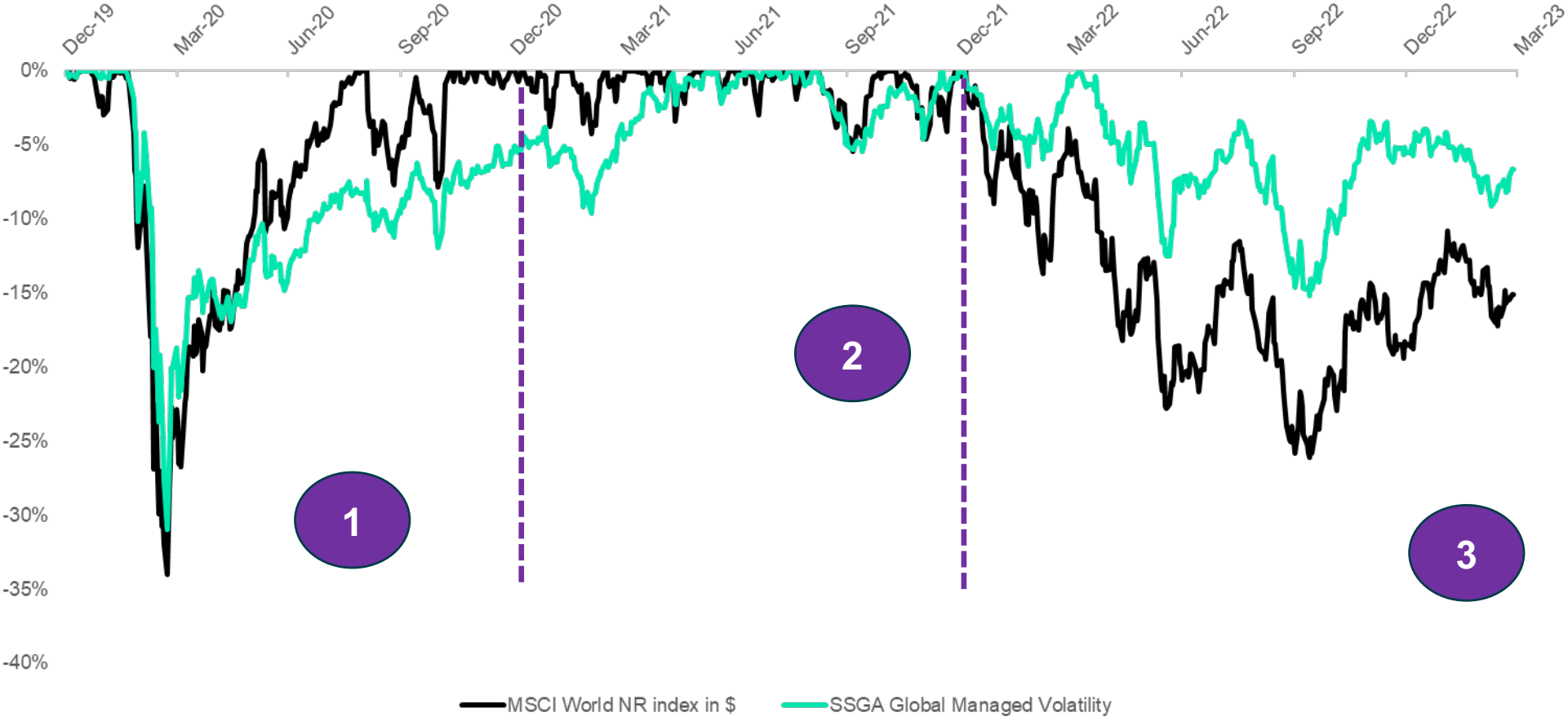
The strong high volatile rebound experienced after March 2020 was a result of all the covid — related fiscal stimulus.

- Here the Volatility Controlled strategy has an underperformance due to the cash drag, missing the equity performance

Case Study 3: Low Volatility Equity

Stay within the equity universe thus not incurring any cash drag.

Drawdown

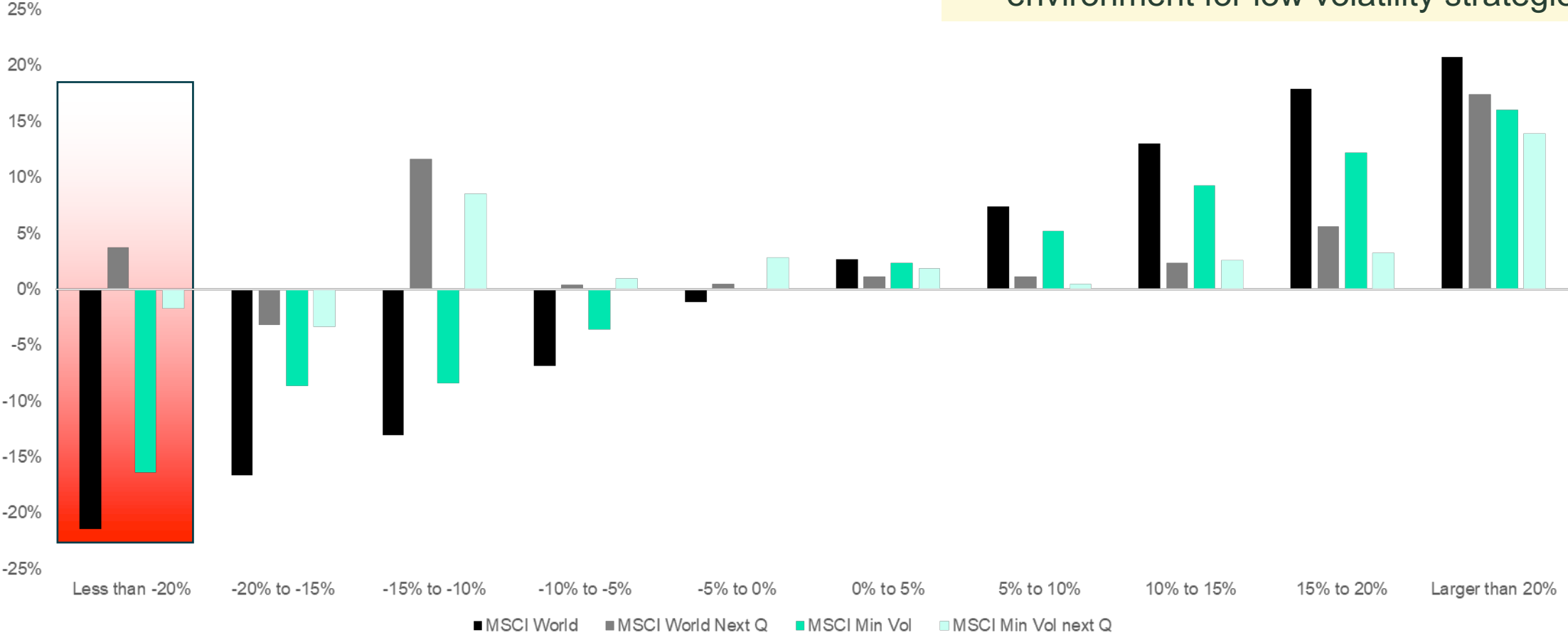


Source: SSGA and Refinitiv as of 24 March 2023.

Case Study 3: Low Volatility Equity (continued)

Quarterly and next quarterly performance

- A (systemic) tail event is a very difficult environment for low volatility strategies



Source: SSGA and Refinitiv as of 24 March 2023.

Case Study 3: Low Volatility Equity (continued)

- 1** Sudden market shock
Defensive equity is inefficient during a strong (systemic) drop
- 2** Soft landing
Defensive equity lags in an upward trending market
- 3** Hard landing
Relative outperformance

Sweet spot for low volatility equity: volatile bearish market environment

Summary Remarks

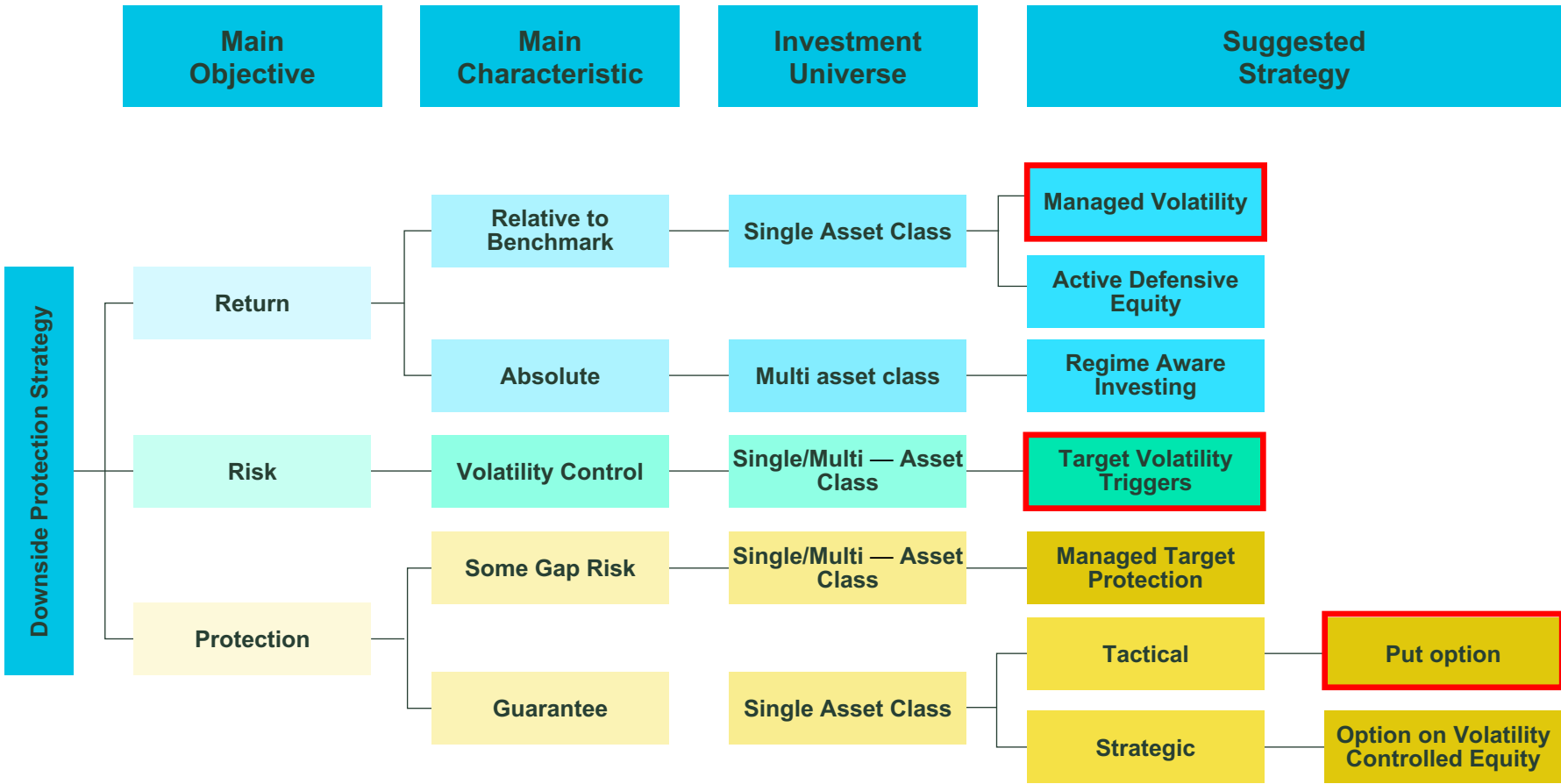
Summary

- Not all protection strategies protect in the same way
- Some strategies capture the rebound better than others after a sudden market crash

Performance (net) & risk indicators	MSCI World	TVT (14% target volatility)	Low Vol Equity (SSGA GMV)
2020	15.9%	-0.4%	-1.0%
2021	21.8%	21.1%	12.7%
2022	-18.1%	-16.7%	-3.9%
Full period	15.6%	0.4%	7.3%
Maximum Drawdown	-34.0%	-24.0%	-31.0%
Volatility 31 Dec 2019 — 31 Dec 2022	21.8%	14.3%	16.2%

Source: SSGA, Refinitiv and Bloomberg as of 24 March 2023. Index returns are unmanaged and do not reflect the deduction of any fees or expenses. Index returns reflect all items of income, gain and loss and the reinvestment of dividends and other income as applicable. Options investing entail a high degree of risk and may not be appropriate for all investors.

Decision Tree



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Appendix A: Important Disclosures

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Bonds generally present less short-term risk and volatility than stocks, but contain interest rate risk (as interest rates raise, bond prices usually fall); issuer default risk; issuer credit risk; liquidity risk; and inflation risk. These effects are usually pronounced for longer-term securities. Any fixed income security sold or redeemed prior to maturity may be subject to a substantial gain or loss.

Hedging involves taking offsetting positions intended to reduce the volatility of an asset. If the hedging position behaves differently than expected, the volatility of the strategy as a whole may increase and even exceed the volatility of the asset being hedged.

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Appendix B

Biography

Biography



Hélène Veltman, PhD

Hélène Veltman is a Senior Strategist in the Investment Strategy and Research team at SSGA since January 2014. She is responsible for developing thought leadership and for the design of multi — asset class solutions for institutional clients.

Hélène was previously fiduciary manager at Axa IM covering the Dutch pension market. Before that experiences include the development of equity derivatives strategies for institutional clients at Société Générale.

Hélène holds a PhD in Physics from UC Berkeley. She is also a designated holder of the Certificate in Climate and Investing from the CFA Institute.