City of Toronto Investment Board

SciBeta Developed Low-Carbon & ESG
HFI Multi-Beta (vol, val, mom, pro/inv)
Maximum Deconcentration

Objectives of the index

- Strong and well-balanced exposures to rewarded factors (value, momentum, volatility and quality)
- Diversification of stock-specific risks via the Max Deconcentration weighting scheme
- Screen worst carbon emitters and ESG laggards without mixing with financial objectives

A systematic construction of the index

ESG / Carbon objectives

Screen the universe to remove carbon and ESG laggards

Robust factor definitions

Select 50% of stocks of the universe with the highest factor characteristics

Avoiding factor dilution

Screen out 40% stocks with poor multi-factor score to maintain high factor intensity

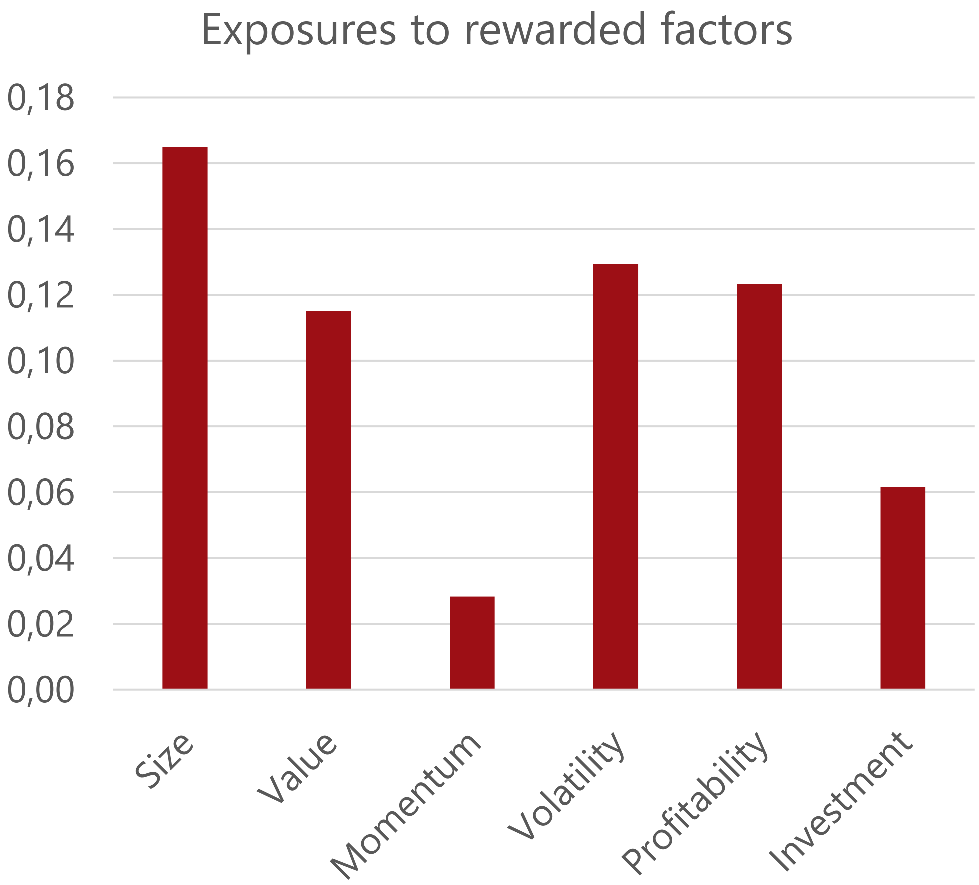
Diversify stock-specific risks

Reduce stock-specific risks by using max deconcentration weighting scheme

Multiple factors to smoothen the cycles

Reduce the cyclicality of factor returns, while maintaining high overall factor intensity

Main characteristics of the index



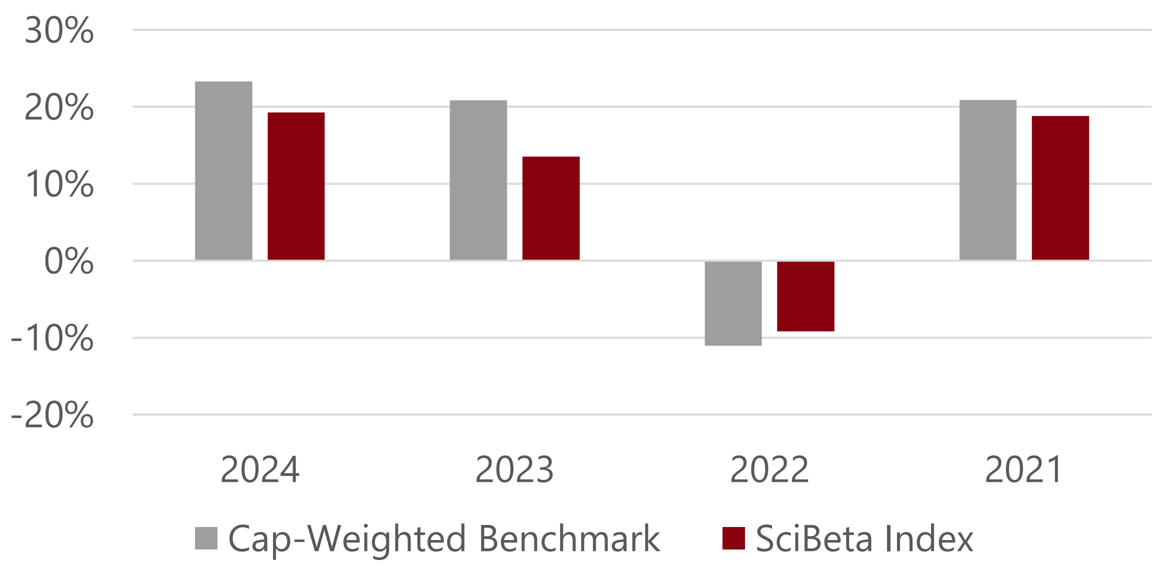
Market Risk	Cap-Weighted Benchmark	SciBeta Index
Market Beta	1.00	0.89

Deconcentration (Sep-24)	Cap-Weighted Benchmark	SciBeta Index
Total Number of Stocks	1470	769
Effective Number of Stocks	105	349
Deconcentration ratio	7.2%	45.4%

ESG / Carbon (Sep-24)	Cap-Weighted Benchmark	SciBeta Index
Carbon intensity (scope 1,2)	100	44

Performance since start of investment

SciBeta Developed 06/01/2021 to 31/10/2024 (CAD / Total Returns)	Cap-Weighted Benchmark	SciBeta Index
Cumulative Returns	60.29%	46.14%
Annualised Returns	13.11%	10.41%
Volatility	12.76%	11.72%



- The index had a cumulative performance of 46.14% since the investment start versus 60.29% for the benchmark.
- The index is defensive with a lower volatility and provided protection in 2022 bear market, while lagging the benchmark the other years (bull market).
- In the following slides, we analyse the main drivers of the underperformance.

Rewarded factors had a positive contribution

SciBeta Developed 06/01/2021 to 31/10/2024 (CAD / Total Returns)	Exposures	Performance attribution
Size	0.17	-0.58%
Value	0.12	0.10%
Momentum	0.03	0.00%
Volatility	0.13	0.57%
Profitability	0.12	-0.29%
Investment	0.06	0.36%
Factor Intensity	0.62	
Factor Deconcentration	5.04	

- The SciBeta index had positive exposures to all the six rewarded factors which are well-balanced.
- The Size exposure is due to the Max Deconcentration weighting scheme.
- The Size and Profitability factors had negative contribution to the performance, while all the other factors had a positive contribution, in particular, the Volatility and Investment factors.
- Overall, the exposures to rewarded factors added 0.16% annually to the performance.

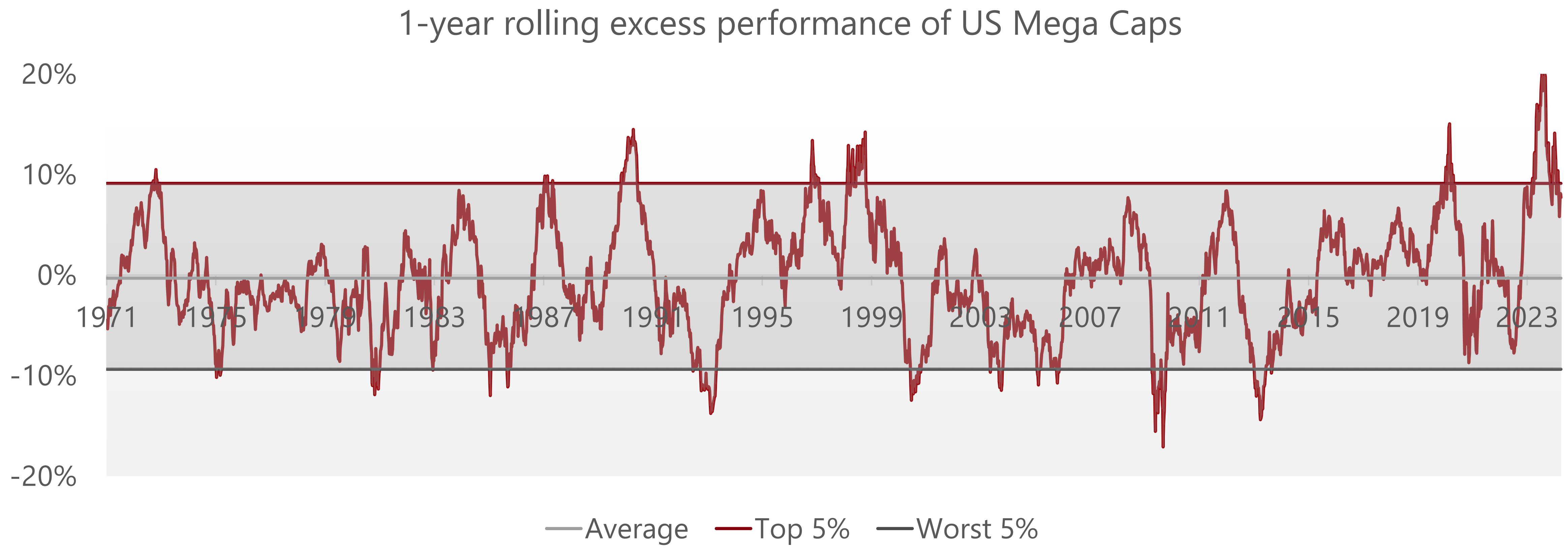
Defensive profile and sector tilts penalised the index

The SciBeta index market beta was 0.89, hence this underexposure to the market had a drag on the relative performance of -1.1%.

The sector deviations which are due to selection and the max deconcentration had overall a negative impact of -1.2% on the relative performance.

Sector analysis Average since 06/01/2021	Relative allocation of SciBeta Index	Sector Attribution
Energy	-2.1%	-1.0%
Basic Materials	-0.2%	0.0%
Industrials	1.2%	-0.1%
Cyclical Consumer	0.0%	0.1%
Non-cyclical Consumer	2.5%	-0.6%
Financials	5.2%	1.0%
Healthcare	0.3%	0.1%
Technology	-7.7%	-0.6%
Telecoms	0.4%	0.0%
Utilities	0.4%	-0.1%
Total	**0.0%**	**-1.2%**

Concentration of performance in the mega caps penalised the index



Conclusion

The SciBeta index implements ESG and carbon objectives while delivering exposures to rewarded factors and deconcentration.

The defensiveness of the index, the concentration of performance of the mega caps and sector tilts had a negative drag on the performance in excess of the cap-weighted benchmark, while exposures to rewarded factors had a positive impact.

The SciBeta index is well positioned to continue to benefit from exposures to rewarded factors and to benefit from deconcentration of the market.

NVIDIA is not selected in the SciBeta

NVIDIA is part of the primary selection of the Momentum or Profitability factor sleeves of the SciBeta index.

But NVIDIA is screened out by the factor intensity filter, which is used to avoid factor dilution, because it has poor valuation, high volatility and high investment. Hence, the stock has an overall poor multi-factor characteristics.

Even if NVIDIA would be selected in the SciBeta index, the underallocation to the stock would still be strong because of the Max Deconcentration weighting scheme.

As of June 2024	Book to Price	Momentum	Volatility	Gross Profits	Investment
NVIDIA	0.02	135.0%	50.0%	37.3%	30.1%
Avg. of US companies	0.27	25.0%	31.6%	24.9%	9.7%
Ranking relative to US	86%	2%	93%	21%	90%