ScientificBeta
An EDHEC-Risk Institute Venture

Performance and Risk Report

SciBeta Developed High-Liquidity Diversified Multi-Strategy

Overview

Index Characteristics

Universe - **Global Developed**

The Global Developed universe consists of equities from Global Developed countries.

Selection - **High Liquidity Stock Selection**

Indices which use liquidity based stock selection typically take a given universe of stocks, and rank each stock according to liquidity, imposing a cutoff which selects / eliminates stocks above / below a threshold from the index.

Weighting - **Diversified Multistrategy**

In the Diversified Multistrategy weighting scheme, five Scientific Beta strategies are combined in order to diversify away individual strategies' specific risks and to mix strategies with different sensitivities to market conditions.

Risk Control - **No Relative Risk Control**

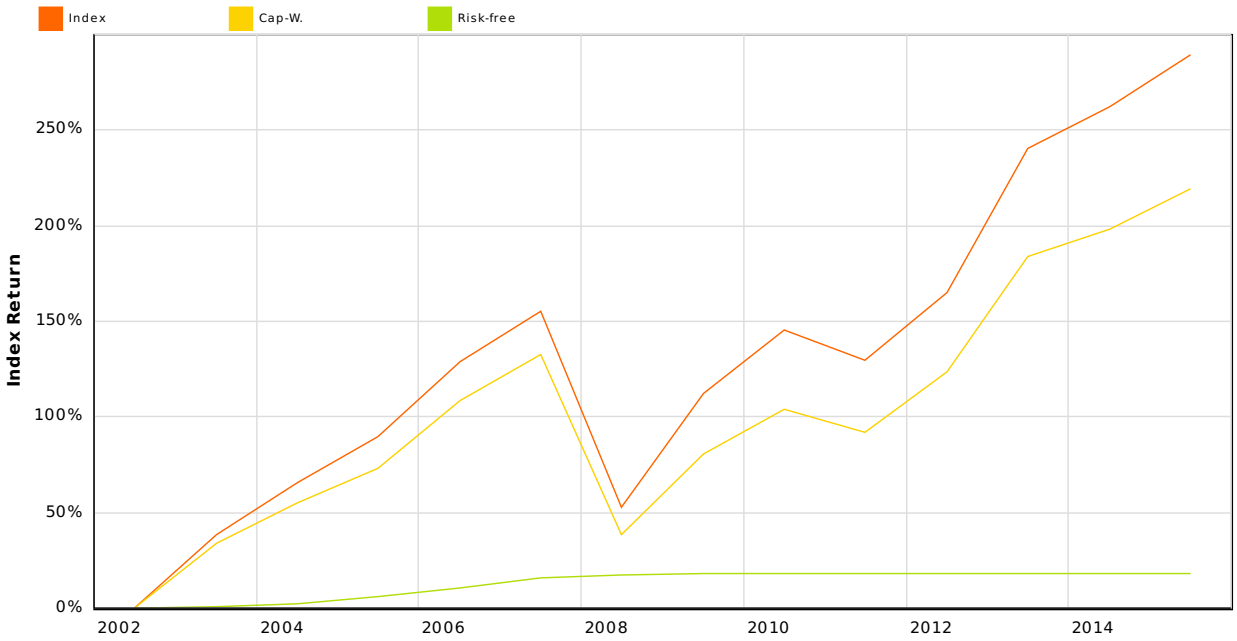
No Relative Risk Control indicates that the strategy does not control the relative risk resulting from a stock selection and weighting scheme decision with regard to the cap-weighted reference index.

Index Description

The table summarises the index construction principles.

SciBeta Dev HLiq MStrat	Index
Currency	USD
Nb. of Constituents	993
Cap Coverage (Dev Universe)	82.1%
Regional Universe	Dev
Stock Selection	HLiq
Weighting Scheme	Div MStrat
Risk Control	None
TO Control	n/a
Inception Date	21-Jun-2002
Live Date	21-Dec-2012
Broad CW	SciBeta Dev CW
Beta CW	SciBeta Dev HLiq CW

Total Return Index (includes reinvestment of dividends)



Latest Performances

Latest Performances provide basic information on returns over the recent period looking back no further than one quarter. In addition, this view provides information on historical return, volatility and the Sharpe Ratio. Latest performances are reported as of the most recent end-of-day data, while more advanced analytics draw on data up to the end of the previous month.

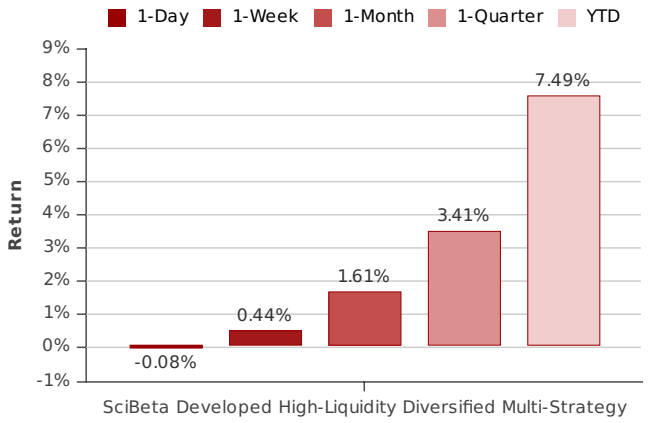
Latest Performances as of 20-May-2015

The table shows the index's absolute returns over recent short time periods. In addition, it reports the historical return, historical volatility, and associated historical Sharpe Ratio. The corresponding statistics of the Beta cap-weighted reference index (Beta CW) and Broad cap-weighted reference index (Broad CW) are also reported.

SciBeta Dev HLiq MStrat	Index	Beta CW	Broad CW
1-Day Return	-0.08%	-0.04%	-0.04%
1-Week Return	0.44%	0.70%	0.81%
1-Month Return	1.61%	1.85%	1.78%
1-Quarter Return	3.41%	3.23%	3.20%
Return (since inception)	10.12%	7.97%	8.48%
Volatility (since inception)	16.32%	16.65%	16.46%
Sharpe ratio (since inception)	0.54	0.40	0.43

Latest Returns as of 20-May-2015

The figure displays the index's absolute returns over recent short time periods.



The statistics are based on daily total returns (with dividends reinvested). The short-term returns are calculated based on the period examined and are not annualised. The statistics of historical performance are annualised. The risk-free rates used to calculate the historical Sharpe Ratio are defined according to the regional universe of the index. The Beta cap-weighted reference index (Beta CW) is the cap-weighted index whose index constituents are drawn from the same stock selection as that of the Scientific Beta index being analysed. The Broad capweighted reference index (Broad CW) is the cap-weighted index whose index constituents cover all stocks in the geographical region of the Scientific Beta index being analysed.

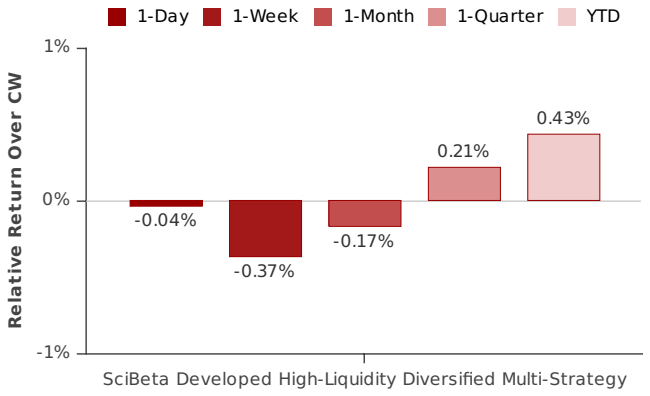
Latest Relative Performances as of 20-May-2015

The table shows the index's relative returns -with regard to its Beta cap-weighted reference index (Beta CW) and Broad cap-weighted reference index (Broad CW) respectively over recent short time periods. In addition, it reports the historical relative return, historical tracking error, and associated historical Information Ratio.

SciBeta Dev HLiq MStrat	/ Beta CW	/ Broad CW
1-Day Relative Return	-0.04%	-0.04%
1-Week Relative Return	-0.26%	-0.37%
1-Month Relative Return	-0.25%	-0.17%
1-Quarter Relative Return	0.18%	0.21%
Relative Return (since inception)	2.15%	1.65%
Tracking-Error (since inception)	1.99%	1.77%
Information ratio (since inception)	1.08	0.93

Latest Relative Returns as of 20-May-2015

The figure displays the index's relative returns with regard to its Broad cap-weighted reference index (Broad CW) over recent short time periods.



The statistics are based on daily total returns (with dividends reinvested). The relative return and tracking error are calculated based on the period examined and are not annualised. The statistics of historical relative performance are annualised. The Beta cap-weighted reference index (Beta CW) is the cap-weighted index whose constituents are drawn from the same stock selection as that of the Scientific Beta index being analysed. The Broad cap-weighted reference index (Broad CW) is the cap-weighted index whose index constituents cover all stocks in the geographical region of the Scientific Beta index being analysed.

Annual Performances

ERI Scientific Beta's annual performance view respectively shows calendar year returns, and calendar year differences in returns over the relevant cap-weighted reference index. Returns are computed as cumulative returns over the respective time period. It should be noted that the most recent observation (which refers to the returns since January 1st of this year up to the most recent end-of-day data) is not directly comparable to the earlier observations (which refer to a full calendar year).

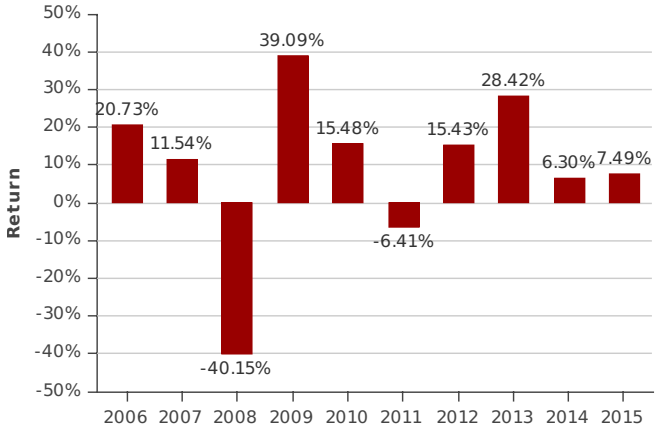
Annual Returns as of 20-May-2015

The table shows the index's returns over each calendar year since 2004. The corresponding statistics of the Beta cap-weighted reference index (Beta CW) and Broad cap-weighted reference index (Broad CW) are also reported.

SciBeta Dev HLiq MStrat	Index	Beta CW	Broad CW
Year 2015 (YTD)	7.49%	6.90%	7.07%
Year 2014	6.30%	4.58%	5.09%
Year 2013	28.42%	26.77%	26.81%
Year 2012	15.43%	15.86%	16.43%
Year 2011	-6.41%	-5.82%	-5.59%
Year 2010	15.48%	11.35%	12.64%
Year 2009	39.09%	31.42%	30.52%
Year 2008	-40.15%	-40.85%	-40.40%
Year 2007	11.54%	11.12%	11.41%
Year 2006	20.73%	19.56%	20.53%

Annual Returns as of 20-May-2015

The figure displays the index's returns over each calendar year since 2004.



The returns are calculated based on daily total returns (with dividends reinvested). The return of the current calendar year is the year-to-date return without annualisation. The Beta cap-weighted reference index (Beta CW) is the cap -weighted index whose index constituents are the same as the Scientific Beta index being analysed. The Broad cap-weighted reference index (Broad CW) is the cap-weighted index whose index constituents cover all stocks in the geographical region of the Scientific Beta index being analysed.

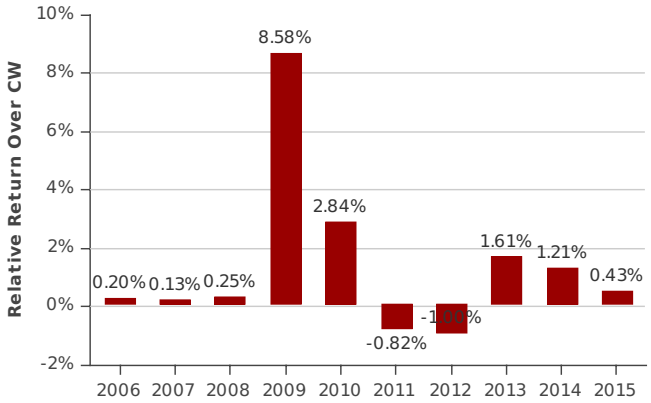
Annual Relative Returns as of 20-May-2015

The table shows the index's relative returns -with regard to its Beta cap-weighted reference index (Beta CW) and Broad cap-weighted reference index (Broad CW) respectively over each calendar year since 2004.

SciBeta Dev HLiq MStrat	/ Beta CW	/ Broad CW
Year 2015 (YTD)	0.60%	0.43%
Year 2014	1.72%	1.21%
Year 2013	1.65%	1.61%
Year 2012	-0.43%	-1.00%
Year 2011	-0.59%	-0.82%
Year 2010	4.13%	2.84%
Year 2009	7.67%	8.58%
Year 2008	0.70%	0.25%
Year 2007	0.42%	0.13%
Year 2006	1.17%	0.20%

Annual Relative Returns as of 20-May-2015

The figure displays the index's relative returns - with regard to its Broad cap-weighted reference index (Broad CW) over each calendar year since 2004.



The relative returns are calculated based on daily total index returns (with dividends reinvested). The relative return of the current calendar year is the year-to-date relative return without annualisation. The Beta cap-weighted reference index (Beta CW) is the cap-weighted index whose index constituents are drawn from the same stock selection as that of the Scientific Beta index being analysed. The Broad cap-weighted reference index (Broad CW) is the cap-weighted index whose index constituents cover all stocks in the geographic region of the Scientific Beta index being analysed.

Performance Analysis

ERI Scientific Beta provides common performance and risk measures across all benchmarks that are available on the platform. In addition to volatility, ERI Scientific Beta reports loss measures such as Maximum Drawdown. All risk and performance measures are reported both in absolute terms and in relation to the cap-weighted reference index. Asymmetric measures such as Maximum Drawdown can be expressed based on relative returns.

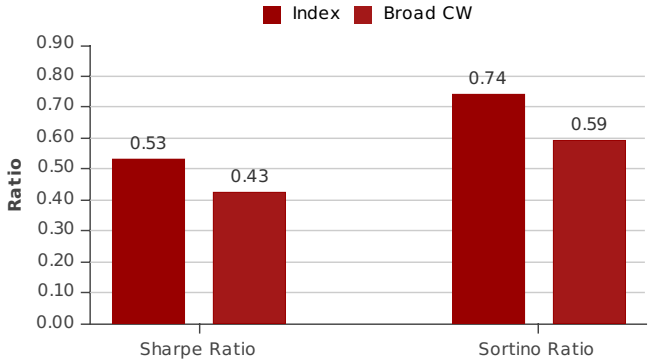
Performance and Risk Characteristics as of 30-Apr-2015

The table shows summary statistics of the index's absolute performance and risk over the selected analysis period. The corresponding statistics of the Beta cap-weighted reference index (Beta CW) and Broad cap-weighted reference index (Broad CW) are also reported.

SciBeta Dev HLiq MStrat	Index	Beta CW	Broad CW
Return	10.05%	7.88%	8.38%
Volatility	16.34%	16.68%	16.48%
Sharpe ratio	0.53	0.39	0.43
Sortino Ratio	0.74	0.54	0.59
Max Drawdown	56.00%	57.65%	57.13%

Performance and Risk Characteristics as of 30-Apr-2015

The figure shows the index's Sharpe Ratio and Sortino Ratio over the selected analysis period. The corresponding statistics of the Beta cap-weighted reference index (Beta CW) and Broad cap-weighted reference index (Broad CW) are also reported.



The statistics are based on daily total returns (with dividends reinvested). All statistics are annualised and performance ratios that involve the average returns are based on the geometric average, which reliably reflects multiple holding period returns for investors. The risk-free rates used are defined according to the regional universe of the index. The Beta cap-weighted reference index (Beta CW) is the cap-weighted index whose constituents are drawn from the same stock selection as that of the Scientific Beta index being analysed. The Broad cap-weighted reference index (Broad CW) is the cap-weighted index whose constituents cover all stocks in the geographic region of the Scientific Beta index being analysed.

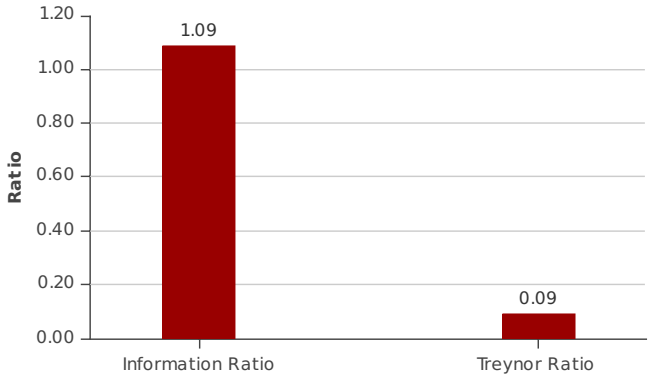
Relative Performance and Risk as of 30-Apr-2015

The table shows summary statistics of the index's relative performance and relative risk with regard to its Beta cap-weighted reference index (Beta CW) and Broad cap-weighted reference index (Broad CW) respectively over the selected analysis period.

SciBeta Dev HLiq MStrat	/ Beta CW	/ Broad CW
Relative Return Over CW	2.17%	1.67%
Tracking-Error	1.99%	1.78%
Information Ratio	1.09	0.94
Treynor Ratio	0.09	0.09
Max Relative Drawdown	4.20%	4.37%

Relative Performance and Risk as of 30-Apr-2015

The figure shows the index's Information Ratio and Treynor Ratio with regard to its Beta cap-weighted reference index (Beta CW) and Broad cap-weighted reference index (Broad CW) respectively over the selected analysis period.



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Risk Analysis

ERI Scientific Beta provides loss measures such as Maximum Drawdown and Value-at-Risk. All risk measures are reported both in absolute terms and in relation to the cap-weighted reference index. In fact, similar to reporting volatility of a risk measure for investors who are interested in returns per se, the volatility of the return difference with the reference index (the so-called tracking error) becomes a relevant risk measure for investors who are concerned about risk relative to their reference index. Similarly, asymmetric measures such as Maximum Drawdown and Value-at-Risk can be expressed based on relative returns.

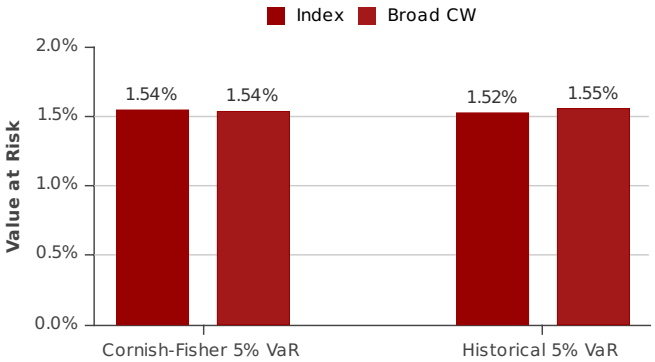
Risk Analysis as of 30-Apr-2015

The table shows summary statistics of the index's absolute performance and risk over the selected analysis period. The corresponding statistics of the Broad cap-weighted reference index (Broad CW) are also reported.

SciBeta Dev HLiq MStrat	Index	Broad CW
Cornish-Fisher 5% VaR	1.54%	1.54%
Historical 5% VaR	1.52%	1.55%
Max Drawdown	56.00%	57.13%
Time Under Water	1350	1421

Risk Analysis as of 30-Apr-2015

The figure shows the index's Cornish-Fisher Value-at-Risk and Historical Value-at-Risk over the selected analysis period. The corresponding statistics of the Broad cap-weighted reference index (Broad CW) are also reported.



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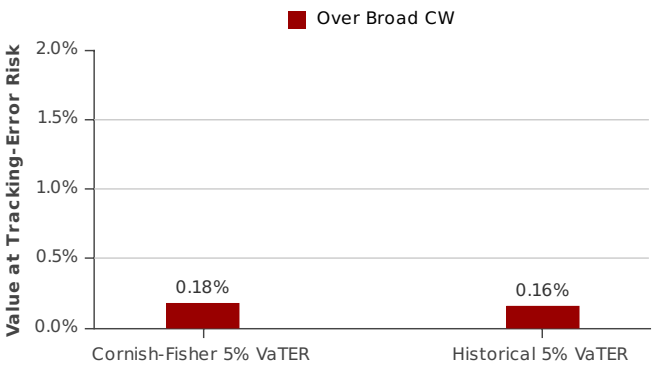
Relative Risk Analysis as of 30-Apr-2015

The table shows summary statistics of the index's relative performance and relative risk with regard to its Broad cap-weighted reference index (Broad CW) over the selected analysis period.

SciBeta Dev HLiq MStrat	/ Broad CW
Cornish-Fisher 5% VaTER	0.18%
Historical 5% VaTER	0.16%
Max Relative Drawdown	4.37%
Rel. Time Under Water	949
Extreme Relative Return (5%)	-1.43%
Extreme Tracking-Error (95%)	2.77%
Average Tracking-Error	1.59%

Relative Risk Analysis as of 30-Apr-2015

The figure shows the index's Cornish-Fisher Value-at-Tracking Error and Historical Value-at-Tracking Error with regard to its Broad cap-weighted reference index (Broad CW) over the selected analysis period.



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Robustness Analysis

ERI Scientific Beta has developed a suite of robustness analytics which allow the different aspects of robustness of a given index to be assessed, and reports Excess returns, Tracking-Error and Information Ratio analyses.

Investors usually wish to assess how close the strategy index is to its cap-weighted reference index. The performance deviation from the reference index is considered as the relative risk. The tracking error is defined by the standard deviation of the difference in returns between the strategy index and its cap-weighted reference index. The lower the value, the closer the risk set of the strategy index to the risk of its reference index.

Equity strategies may also be designed to maximise the value of the Information Ratio (i.e. to achieve a high residual return at a low level of tracking error). The Information Ratio presented by Sharpe (1994) enables an investor to assess whether the risk taken by the strategy in deviating from the reference index is sufficiently rewarded.

The probability of outperformance is defined as the empirical frequency of outperforming the cap-weighted reference index over a given investment horizon. It is an intuitive and relevant measure for investment practitioners which shows how often and consistently the strategy would be able to outperform the cap-weighted reference index in the past for all possible entry points. It is calculated by computing the frequency of obtaining positive excess returns if one invests in the strategy for a period of 1, 3, or 5 years at any point in time (we use end of weeks starting points) during the complete history (in other words, after inception) of the strategy.

To assess the robustness of smart beta strategies over a long period of time that includes different market and economic cycles, ERI Scientific Beta offers detailed analytics of all the diversification strategies available on the Scientific Beta platform over 40 years (Dec 1974 – Dec 2014) for a USA stock universe.

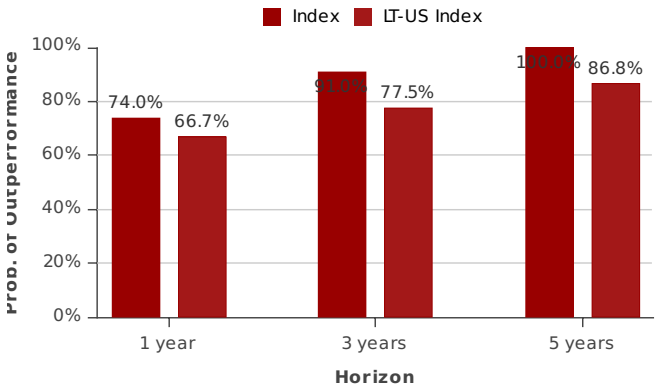
Robustness Analysis as of 30-Apr-2015

The table shows summary statistics of the index's relative performance and relative risk (with respect to its cap-weighted reference index) as well as the 1Y, 3Y and 5Y Probabilities of Outperformance, over the last 10 years, and for the corresponding US Long-Term, over the last 40 years.

SciBeta Dev HLiq MStrat	Index	LT-US
Excess Return	1.46%	1.65%
Tracking-Error	1.58%	2.95%
Information Ratio	0.92	0.56
Prob. of Outperf. (1 year)	74.0%	66.7%
Prob. of Outperf. (3 years)	91.0%	77.5%
Prob. of Outperf. (5 years)	100.0%	86.8%
End of Period	30-Apr-2015	31-Dec-2014
Period	10 years	40 years

Robustness Analysis as of 30-Apr-2015

The figure, based on a rolling window analysis, shows the 1, 3, and 5 year Probability of Outperformance with respect to the cap-weighted reference index.



The statistics are based on daily total returns (with dividends reinvested). All statistics are annualised and based on the geometric average, which reliably reflects multiple holding period returns for investors.

Top Holdings

ERI Scientific Beta reports the weights of the ten largest constituents of the strategy portfolio in descending order, with the country and sector names associated. The ten largest constituents are sorted based on the portfolio's stock weight at the last rebalancing date.

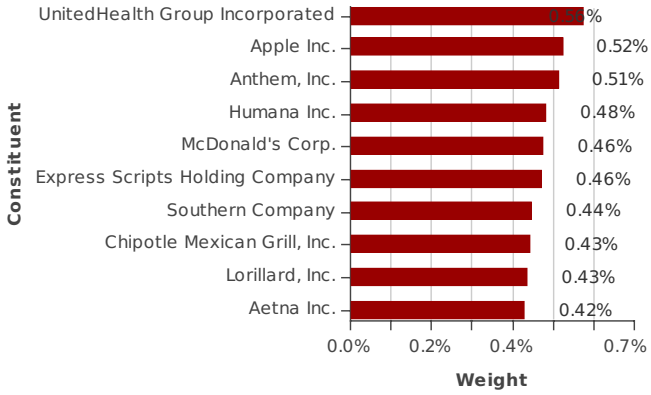
Top Holdings as of 20-Mar-2015

The table lists the weights of the ten largest constituents of the index, in descending order, based on the index's weight profile at the last quarterly rebalancing.

SciBeta Dev HLiq MStrat	Country	Weight
UnitedHealth Group Incorporated	US	0.56%
Apple Inc.	US	0.52%
Anthem, Inc.	US	0.51%
Humana Inc.	US	0.48%
McDonald's Corp.	US	0.46%
Express Scripts Holding Company	US	0.46%
Southern Company	US	0.44%
Chipotle Mexican Grill, Inc.	US	0.43%
Lorillard, Inc.	US	0.43%
Aetna Inc.	US	0.42%

Top Holdings as of 20-Mar-2015

The figure displays the weights of the ten largest constituents of the index, in descending order, based on the index's weight profile at the last quarterly rebalancing.



Weight Profile Analysis

ERI Scientific Beta uses various measures for evaluating concentration. The first measure is the effective number of stocks. It is given by the inverse of the sum of squared constituent weights. A low value represents a strategy concentrated in few stocks. We then report the nominal number of stocks in the strategy portfolio, followed by the number of stocks that comprise 90%, 75%, 50% and 25% of the market capitalisation of the strategy portfolio to show the distribution of stocks in terms of market capitalisation. We also report the Deconcentration ratio, defined as the ratio of the effective number of stocks over the nominal number of stocks. Finally, we report the GLR measure which measures diversification benefit and is the ratio of the variance of the portfolio returns to the weighted average of the variance of its constituents' returns.

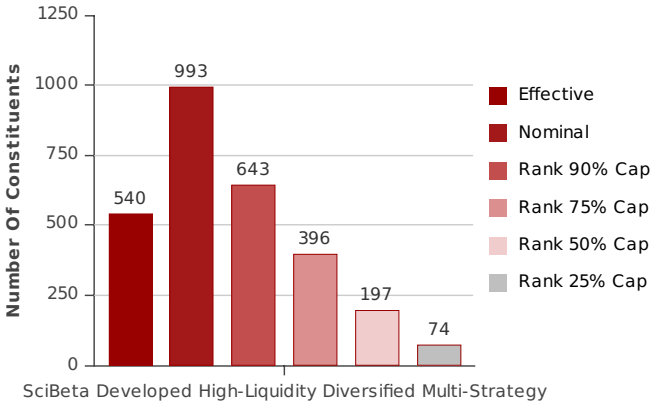
Index Weight Concentration as of 20-Mar-2015

The table shows the index concentration level under various portfolio concentration measures based on the index's weight profile at the last rebalancing time, and the low correlation objective measure (GLR) based on historical returns and the index's historical weights since inception. The corresponding statistics of the Beta cap-weighted reference index (Beta CW) and Broad cap-weighted reference index (Broad CW) are also reported.

SciBeta Dev HLiq MStrat	Index	Beta CW	Broad CW
Effective Number of Stocks	540	263	380
Nominal Number of Stocks	993	993	2000
Nb. Stocks Cumul. to 90% Cap	643	495	924
Nb. Stocks Cumul. to 75% Cap	396	279	483
Nb. Stocks Cumul. to 50% Cap	197	110	168
Nb. Stocks Cumul. to 25% Cap	74	33	45
Deconcentration ratio	54.4%	26.5%	19.0%
GLR	17.0%	20.4%	19.8%

Index Weight Concentration as of 20-Mar-2015

The figure displays the index concentration level under various portfolio concentration measures based on the index's weight profile at the last rebalancing time.



The Beta cap-weighted reference index (Beta CW) is the cap-weighted index whose index constituents are drawn from the same stock selection as that of the Scientific Beta index being analysed. The Broad cap-weighted reference index (Broad CW) is the cap-weighted index whose index constituents cover all stocks in the geographic region of the Scientific Beta index being analysed.

Index Fundamentals

ERI Scientific Beta reports five fundamental valuation metrics quarterly. Figures are based on data available as of the latest cut-off date (two weeks ahead of the Scientific Beta review date):

- Price to Earnings Ratio
- Price to Earnings Ratio (excluding Negative Earnings)
- Price to Cash Flow Ratio
- Price to Sales Ratio
- Price to Book Value Ratio
- Dividend Yield

The fundamental data is the latest twelve months (LTM) view recalculated at every quarter end. LTM results for a particular period end date is calculated by adding the difference of the financials from the year-to-date period on that date and the corresponding year-to-date period from the prior year, to the financials from the most recently completed fiscal year results as of that date.

In the event that the fundamental value is not available for a given security, we exclude the corresponding stock from our calculation of the fundamental attributes.

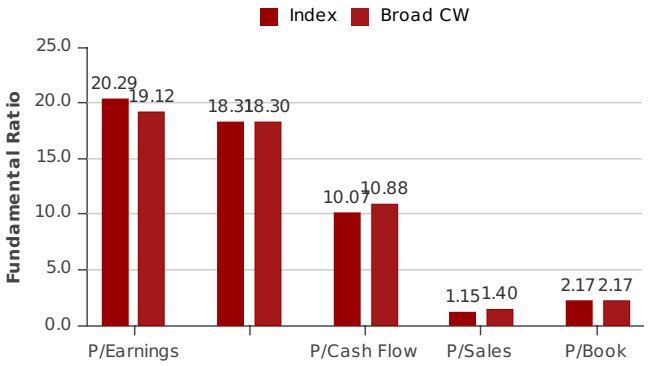
Index Fundamentals as of 20-Mar-2015

The table shows the index's fundamental attributes based on the index's weight profile at the last rebalancing time. The corresponding statistics of the Broad cap-weighted reference index (Broad CW) are also reported.

SciBeta Dev HLiq MStrat	Index	Broad CW
Price / Earnings	20.29	19.12
Price / Earnings (ex Neg)	18.31	18.30
Price / Cash Flow	10.07	10.88
Price / Sales	1.15	1.40
Price / Book Value	2.17	2.17
Dividend Yield	2.15%	2.27%

Index Fundamentals as of 20-Mar-2015

The figure displays the index's fundamental attributes based on the index's weight profile at the last rebalancing time. The corresponding statistics of the Broad cap-weighted reference index (Broad CW) are also reported.



The Broad cap-weighted reference index (Broad CW) is the cap-weighted index whose constituents cover all stocks in the geographic region of the Scientific Beta index being analysed.

Extreme Risk Analysis

ERI Scientific Beta uses a GARCH-EVT model to estimate VaR and CVaR in which EVT is applied through the POT method.

The Extreme Risk Module provides 1% VaR and 1% CVaR risk statistics of strategies and the cap-weighted benchmark aggregated for a selected period of time, the risk-return ratios based on the 1% VaR and 1% CVaR risk statistics, and also monthly forecasts of the two risk statistics. The same analysis is provided both for absolute and relative returns.

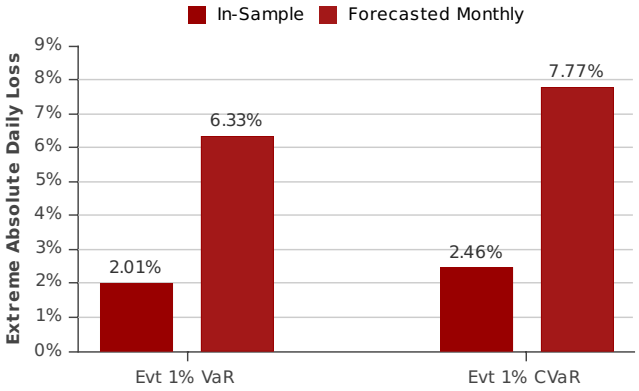
Extreme Risk Analysis as of 30-Apr-2015

The table shows summary statistics of the index's extreme risk over the selected analysis period. The corresponding statistics of the Broad cap-weighted reference index (Broad CW) are also reported.

SciBeta Dev HLiq MStrat	Index	Broad CW
Return	10.05%	8.38%
EVT 1% VaR	2.01%	2.03%
EVT 1% CVaR	2.46%	2.47%
Ret to EVT 1% VaR ratio	0.27	0.21
Ret to EVT 1% CVaR ratio	0.22	0.18
For. Monthly EVT 1% VaR	6.33%	6.59%
For. Monthly EVT 1% CVaR	7.77%	8.27%

Extreme Risk Analysis as of 30-Apr-2015

The figure shows the in-sample and forecasted monthly Value-at-Risk and Conditional Value–at-Risk for the index over the selected analysis period.



Broad CW is the cap-weighted index whose constituents cover all stocks in the geographic region of the Scientific Beta index being analysed.

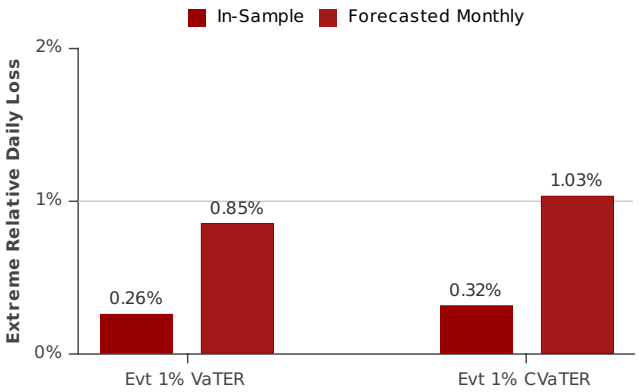
Extreme Relative Risk Analysis as of 30-Apr-2015

The table shows summary statistics of the index's extreme relative risk with regard to its Broad cap-weighted reference index (Broad CW) over the selected analysis period.

SciBeta Dev HLiq MStrat	/ Broad CW
Excess Return	1.67%
EVT 1% VaTER	0.26%
EVT 1% CVaTER	0.32%
Ret to EVT 1% VaTER ratio	0.40
Ret to EVT 1% CVaTER ratio	0.33
For. Monthly EVT 1% VaTER	0.85%
For. Monthly EVT 1% CVaTER	1.03%

Extreme Relative Risk Analysis as of 30-Apr-2015

The figure shows the in-sample and forecasted monthly Value-at-Tracking Error and Conditional Value-at-Tracking Error for the index over the selected analysis period.



Broad CW is the cap-weighted index whose constituents cover all stocks in the geographic region of the Scientific Beta index being analysed.

CAPM Analysis

The following regression is performed on the excess return series of the strategy index over the selected time period:

$$R_p - R_F = \alpha_p + \beta_M (R_M - R_F) + \varepsilon$$

where R_P, R_F and R_M respectively denote the vectors of daily returns for the strategy portfolio, the risk-free rate and the market portfolio (i.e. the cap-weighted reference index). The vector ε is a noise term.

The coefficients α_P (CAPM alpha) and β_M (market factor beta) of this linear model are estimated via Ordinary Least Squares (OLS).

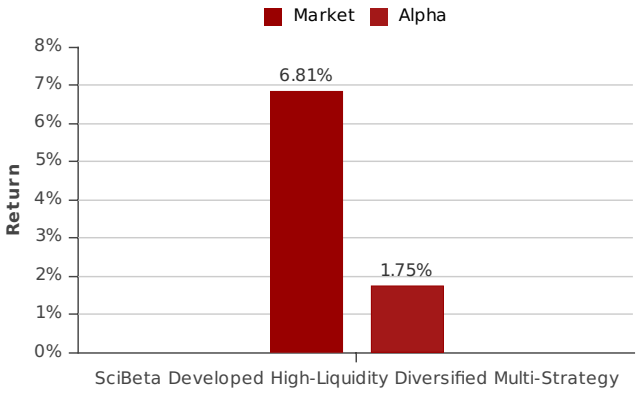
CAPM Analysis as of 30-Apr-2015

The table shows the coefficient estimates and R-squared of the regression of the index's excess returns (over the risk-free rate) using the CAPM single factor model over the selected analysis period. Based on the factor exposure, the excess returns attributed to each factor are reported in the last column. The t-statistics associated with the coefficient estimates are also reported.

SciBeta Dev HLiq MStrat	Coefficient	t-stat	Perf.
Alpha	1.64%	3.3	1.75%
Market	0.99	534.5	6.81%
r^2	0.99		

CAPM Performance Attribution as of 30-Apr-2015

The figure displays the attribution of the index's excess return (over the risk-free rate) to market factor and unexplained excess returns (Alpha).



The data are daily total returns (with dividends reinvested). The Market factor is the daily return of the cap-weighted index of all stocks that constitute the index portfolio. The risk-free rates used are defined according to the regional universe of the index.

Fama-French Factor Analysis

The following regression is performed on the excess return series of the strategy index over the selected time period:

$$R_P - R_F = \alpha_P + \beta_M(R_M - R_F) + \beta_S SMB + \beta_V HML + \varepsilon$$

where R_P, R_F, R_M, SMB and HML respectively denote the vectors of daily returns for the strategy portfolio, the risk-free rate, the market portfolio (i.e. the cap-weighted reference index), the small size factor and the value factor. The vector ε is a noise term.

SMB factor (small size factor) is the daily return series of a cap-weighted portfolio that is long the top 30% stocks (small market-cap stocks) and short the bottom 30% stocks (large market-cap stocks) sorted on market capitalisation in ascending order.

HML factor (value factor) is the daily return series of a cap-weighted portfolio that is long the top 30% stocks (value stocks) and short the bottom 30% stocks (growth stocks) sorted on book-to-market value in descending order.

The coefficients α_P (Fama-French alpha), β_M (market factor beta), β_S (small size factor beta), β_V (value factor beta) of this linear model are estimated via Ordinary Least Squares (OLS).

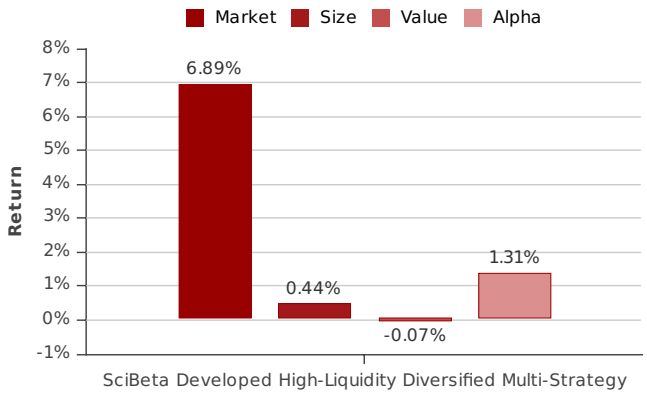
Fama-French Factor Analysis as of 30-Apr-2015

The table shows the coefficient estimates and R-squared of the regression of index's excess returns (over the risk-free rate) using the Fama French three-factor model over the selected analysis period. Based on the factor exposure, the excess returns attributed to each factor are reported in the last column. The t-statistics associated with the coefficient estimates are also reported.

SciBeta Dev HLiq MStrat	Coefficient	t-stat	Perf.
Alpha	1.16%	2.6	1.31%
Market factor	1.00	495.6	6.89%
Size factor (SMB)	0.11	29.5	0.44%
Value factor (HML)	-0.02	-4.2	-0.07%
r^2	0.99		

Fama-French Factor Performance Attribution as of 30-Apr-...

The figure displays attribution of the index's excess return (over the risk-free rate) to market factor, HML factor, SMB factor, and unexplained excess returns (Alpha).



The data are daily total returns (with dividends reinvested). The Market factor is the daily return of the cap-weighted index of all stocks that constitute the index portfolio. SMB factor is the daily return series of a portfolio that is long for the bottom 30% stocks ranked by market capitalisation (mid market-cap stocks) and short for the top 30% stocks ranked by market capitalisation (large market-cap stocks). HML factor is the daily return series of a portfolio that is long for the top 30% stocks (value stocks) and short for the bottom 30% stocks (growth stocks) sorted on book-to-market value in descending order. The risk-free rates used are defined according to the regional universe of the strategy. It should be noted that as ERI Scientific Beta Indices contain only large and mid cap stocks, exposures to the size factor are based on ERI Scientific Beta factors and consequently, the size exposure is a mid cap exposure.

Carhart Factor Analysis

The following regression is performed on the excess return series of the strategy index over the selected time period:

$$R_P - R_F = \alpha_P + \beta_M(R_M - R_F) + \beta_S SMB + \beta_V HML + \beta_{MOM} MOM + \varepsilon$$

where R_P, R_F, R_M, SMB, HML and MOM respectively denote the vectors of daily returns for the strategy portfolio, the risk-free rate, the market portfolio (i.e. the cap-weighted reference index), the small size factor, the value factor, and the momentum factor. The vector ε is a noise term.

SMB factor (small size factor) is the daily return series of a cap-weighted portfolio that is long the top 30% stocks (small market-cap stocks) and short the bottom 30% stocks (large market-cap stocks) sorted on market capitalisation in ascending order.

HML factor (value factor) is the daily return series of a cap-weighted portfolio that is long the top 30% stocks (value stocks) and short the bottom 30% stocks (growth stocks) sorted on book-to-market value in descending order.

MOM factor (momentum factor) is the daily return series of a cap-weighted portfolio that is long the top 30% stocks (winner stocks) and short the bottom 30% stocks (loser stocks) sorted on past returns in descending order.

The coefficients α_P (Fama-French alpha), β_M (market factor beta), β_S (small size factor beta), β_V (value factor beta) and β_{MOM} (momentum factor beta) of this linear model are estimated via Ordinary Least Squares (OLS).

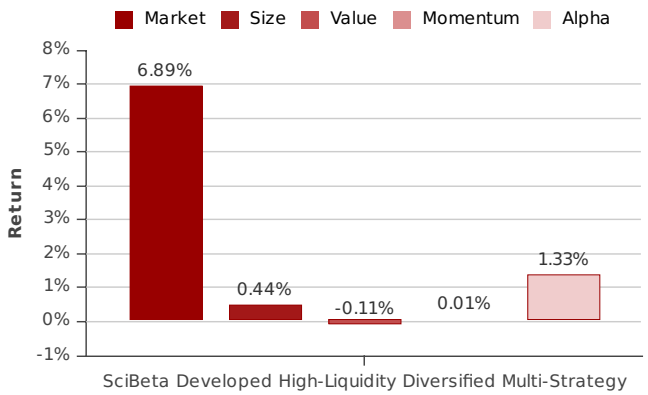
Carhart Factor Analysis as of 30-Apr-2015

The table shows the coefficient estimates and r-square of the regression of the strategy's excess returns (over the risk-free rate) using the Carhart four-factor model over the selected analysis period. Based on the factor exposure, the excess returns attributed to each factor are reported in the last column. The t-statistics associated with the coefficient estimates are also reported.

SciBeta Dev HLiq MStrat	Coefficient	t-stat	Perf.
Alpha	1.20%	2.7	1.33%
Market factor	1.00	493.3	6.89%
Size factor (SMB)	0.11	29.8	0.44%
Value factor (HML)	-0.03	-5.7	-0.11%
Momentum factor (MOM)	-0.01	-3.9	0.01%
r^2	0.99		

Carhart Factor Performance Attribution as of 30-Apr-2015

The figure displays the attribution of the index's excess return (over the risk-free rate) to market factor, HML factor, SMB factor, MOM factor, and unexplained excess returns (Alpha).



The data are daily total returns (with dividends reinvested). The Market factor is the daily return of the cap-weighted index of all stocks that constitute the index portfolio. SMB factor is the daily return series of a portfolio that is long for the bottom 30% stocks ranked by market capitalisation (mid market-cap stocks) and short for the top 30% stocks ranked by market capitalisation (large market-cap stocks). HML factor is the daily return series of a portfolio that is long for the top 30% stocks (value stocks) and short for the bottom 30% stocks (growth stocks) sorted on book-to-market value in descending order. The MOM factor is calculated as the daily return series of a cap-weighted portfolio that is long the winner stocks and short the loser stocks. The winner stocks (inversely the loser stocks) are defined as the top 30% (inversely the bottom 30%) of stocks, sorted on the past 104 weeks' compounded returns excluding the most recent month, in descending order. The risk-free rates used are defined according to the regional universe of the index.

Bull/Bear Market Performances

The full history of daily returns is divided into calendar year quarters. The daily returns that do not constitute a full calendar quarter (if any are present at the beginning and end of the time series) are excluded from the analysis. Quarters in which the return of the cap-weighted reference index is positive (resp. negative) are classified as bull market (resp. bear market) quarters. The series of daily returns of the index across all the bull market (resp. bear market) quarters are consolidated into a single synthetic bull market (resp. bear market) time series. The two resulting sets of daily returns are then used to compute annualised risk and performance statistics. The absolute performance statistics are the annualised returns, volatility and Sharpe ratio for bull and bear market regimes. Additionally, for relative performance analysis, annualised excess returns, tracking error, and Information ratio are also computed over the two regimes.

ERI Scientific Beta also provides the distribution (maximum, arithmetic average and minimum) of the annualised absolute and relative returns for each market regime.

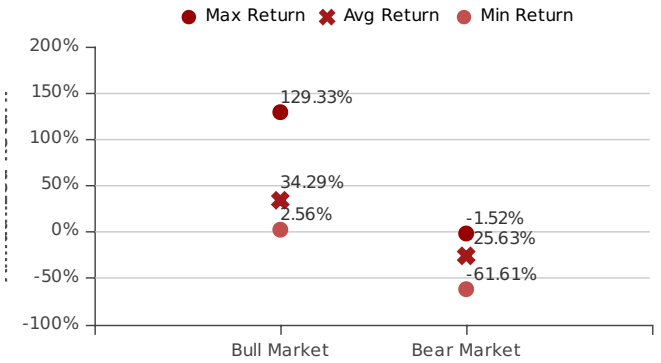
Bull / Bear Market Performances as of 30-Apr-2015

The analysis is based on the complete history of index returns. The table shows general statistics of the index's absolute performance and risk in the periods of bull and bear market regimes respectively.

SciBeta Dev HLiq MStrat	Bull Market	Bear Market
Annualized Return	31.51%	-28.71%
Volatility	12.39%	23.15%
Sharpe ratio	2.43	-1.30

Bull / Bear Market Performances as of 30-Apr-2015

The figure displays the index's average, minimum, and maximum annualised absolute returns in quarters characterised by bull and bear market regimes respectively. The analysis is based on the complete history of index returns.



The statistics are based on daily total returns (with dividends reinvested). The returns and volatility are annualised. The risk-free rate used is defined according to the regional universe of the index.

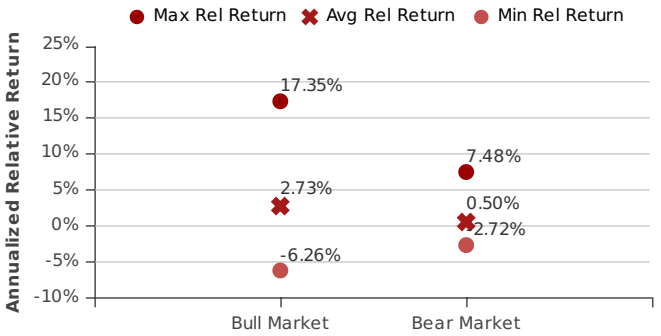
Bull / Bear Market Rel. Performances as of 30-Apr-2015

The analysis is based on the complete history of index returns. The table shows general statistics of the index's relative performance and relative risk (with respect to its cap-weighted reference index) in the periods of bull and bear market regimes respectively.

SciBeta Dev HLiq MStrat	Bull Market	Bear Market
Annualized Relative Return	2.44%	0.61%
Tracking-Error	1.50%	2.30%
Information Ratio	1.63	0.26

Bull / Bear Market Rel. Performances as of 30-Apr-2015

The figure displays the index's average, minimum and maximum annualised relative returns (with respect to its cap-weighted reference index) in quarters characterised by bull and bear market regimes, respectively. The analysis is based on the complete history of index returns.



The statistics are based on daily total returns (with dividends reinvested). The relative returns and tracking error are annualised. The risk-free rate used is defined according to the regional universe of the index.

High/Low Vol Regime Performances

The full history of daily returns is divided into calendar year quarters. The daily returns that do not constitute a full calendar quarter (if any are present at the beginning and end of the time series) are excluded from the analysis. Quarters in which the volatility of the cap-weighted reference index is greater (resp. lower) than the median volatility across all quarters are classified as high volatility (resp. low volatility) quarters. The series of daily returns of the index across all the high volatility (resp. low volatility) quarters are consolidated into a single synthetic high volatility (resp. low volatility) time series. The two resulting sets of daily returns are then used to compute annualised risk and performance statistics. The absolute performance statistics are the annualised returns, volatility and Sharpe ratio for low volatility and high volatility regimes. Additionally, for relative performance analysis, annualised excess returns, tracking error, and Information ratio are also computed over the two regimes.

ERI Scientific Beta also provides the distribution (maximum, arithmetic average and minimum) of the annualised absolute and relative returns for each volatility regime.

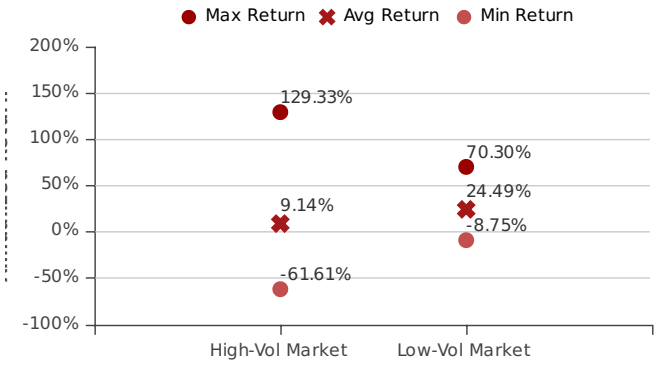
High / Low Vol Regime Performances as of 30-Apr-2015

The analysis is based on the complete history of index returns. The table shows general statistics of the index's absolute performance and risk in the periods of high and low volatility market regimes respectively.

SciBeta Dev HLiq MStrat	High Vol Regime	Low Vol Regime
Annualized Return	-1.33%	22.78%
Volatility	21.08%	9.24%
Sharpe ratio	-0.11	2.27

High / Low Vol Regime Performances as of 30-Apr-2015

The figure displays the index's average, minimum, and maximum quarterly absolute returns in quarters characterised by high and low volatility market regimes respectively. The analysis is based on the complete history of index returns.



The statistics are based on daily total returns (with dividends reinvested). The returns and volatility are annualised. The risk-free rate used is defined according to the regional universe of the index.

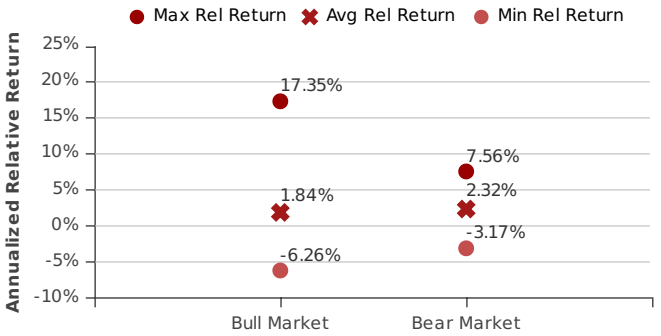
High / Low Vol Regime Rel. Performances as of 30-Apr-201..

The analysis is based on the complete history of index returns. The table shows general statistics of the index's relative performance and relative risk (with respect to its cap-weighted reference index) in the periods of high and low volatility market regimes respectively.

SciBeta Dev HLiq MStrat	High Vol Regime	Low Vol Regime
Annualized Relative Return	1.29%	2.24%
Tracking-Error	2.12%	1.32%
Information Ratio	0.61	1.69

High / Low Vol Regime Rel. Performances as of 30-Apr-201..

The figure displays the index's average, minimum and maximum quarterly relative returns (with respect to its cap-weighted reference index) in quarters characterised by high and low volatility market regimes, respectively. The analysis is based on the complete history of index returns.



The statistics are based on daily total returns (with dividends reinvested). The relative returns and tracking error are annualised. The risk-free rate used is defined according to the regional universe of the index.

Turnover & Capacity

Turnover Analysis refers to the measurement of how frequently, and in which relative proportions, the constituents of an equity strategy index are traded over a quarter.

Capacity refers to the weighted average market capitalisation of the constituents in the index.

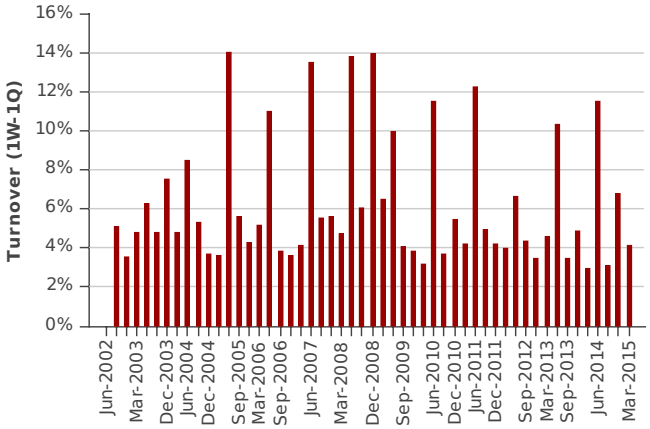
Turnover & Capacity as of 20-Mar-2015

The table shows the turnover level of the index compared to that of the Beta cap-weighted reference index (Beta CW) and Broad cap-weighted reference index (Broad CW) respectively in %. It also shows the capacity of the index and the referenceindices, as measured by the average market capitalisations, in M$.

SciBeta Dev HLiq MStrat	Index	Beta CW	Broad CW
Turnover (annualised)	24.8%	3.7%	4.2%
Average Capacity (M$)	31244	77775	65421
Latest Capacity (M$)	47646	107857	90728

Turnover History as of 20-Mar-2015

The chart below shows the turnover history of the index since inception on a quarterly basis.



The Beta cap-weighted reference index (Beta CW) is the cap-weighted index whose index constituents are drawn from the same stock selection as that of the Scientific Beta index being analysed. The Broad cap-weighted reference index (Broad CW) is the cap-weighted index whose index constituents cover all stocks in the geographic region of the Scientific Beta index being analysed.

Country Allocation

ERI Scientific Beta shows top country exposures (in weight %) of the strategy, based on the portfolio's stock weight profile at the last rebalancing date. We show the distribution of absolute country weights over countries as well as the relative country weights of the strategy with respect to those of the cap-weighted reference index. The top countries are ordered by their country capitalisation at the last rebalancing time.

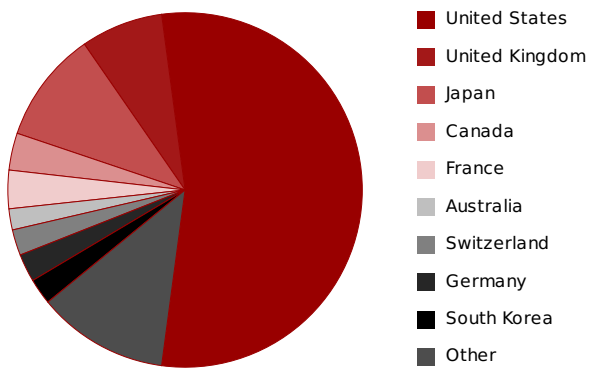
Country Allocation as of 20-Mar-2015

The table shows top country exposures (in weight percentage) of the index, based on the index's weight profile at the last rebalancing time.

SciBeta Dev HLiq MStrat	Weight
United States	54.2%
United Kingdom	7.5%
Japan	10.2%
Canada	3.4%
France	3.5%
Australia	1.9%
Switzerland	2.4%
Germany	2.6%
South Korea	2.4%
Other	12.0%

Country Allocation as of 20-Mar-2015

The figure displays industry sector exposures (in weight percentage) of the index, based on the index's weight profile at the last rebalancing time.



The top countries are ordered by their country capitalisation at the last rebalancing time.

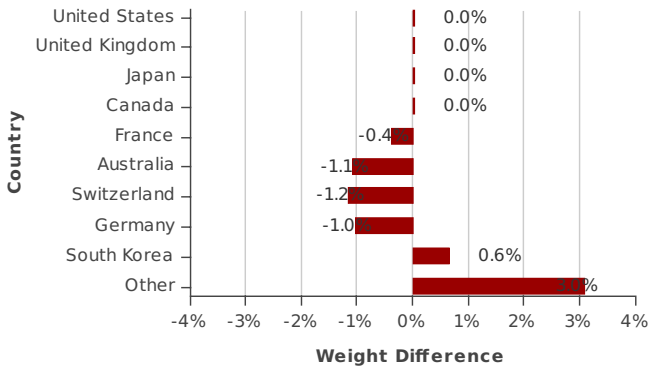
Country Allocation as of 20-Mar-2015

The table shows top relative country exposures (in relative weight percentage) of the index with regard to the cap-weighted reference index, based on the index's weight profile at the last rebalancing time.

SciBeta Dev HLiq MStrat	Excess Weight
United States	0.0%
United Kingdom	0.0%
Japan	0.0%
Canada	0.0%
France	-0.4%
Australia	-1.1%
Switzerland	-1.2%
Germany	-1.0%
South Korea	0.6%
Other	3.0%

Country Allocation as of 20-Mar-2015

The figure displays top relative country exposures (in relative weight percentage) of the index with regard to the cap-weighted reference index, based on the index's weight profile at the last rebalancing time.



The top countries are ordered by their country capitalisation at the last rebalancing time.

Sector Allocation

ERI Scientific Beta shows industry sector exposures (in weight %) of the strategy, based on portfolio's stock weight profile at the last rebalancing date. We show the distribution of absolute sector weights over sectors as well as the relative sector weights of the strategy with respect to those of the cap-weighted reference index. We use the following 10 sectors classification: Energy, Materials, Industrials, Cyclical Consumer Goods and Services, Non-Cyclical Consumer Goods and Services, Healthcare, Financials, Information Technology, Telecommunication Services and Utilities.

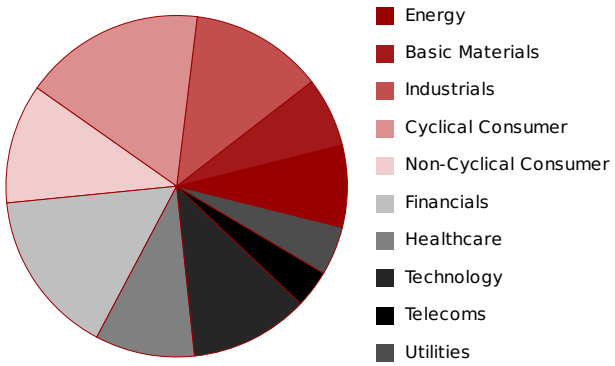
Sector Allocation as of 20-Mar-2015

The table shows industry sector exposures (in weight percentage) of the index, based on the index's weight profile at the last rebalancing time.

SciBeta Dev HLiq MStrat	Weight
Energy	7.8%
Basic Materials	6.6%
Industrials	12.6%
Cyclical Consumer	17.2%
Non-Cyclical Consumer	11.3%
Financials	15.7%
Healthcare	9.4%
Technology	11.3%
Telecoms	3.5%
Utilities	4.6%

Sector Allocation as of 20-Mar-2015

The figure displays industry sector exposures (in weight percentage) of the index, based on the index's weight profile at the last rebalancing time.



The sector classification used is the Thomson Reuters Business Classification.

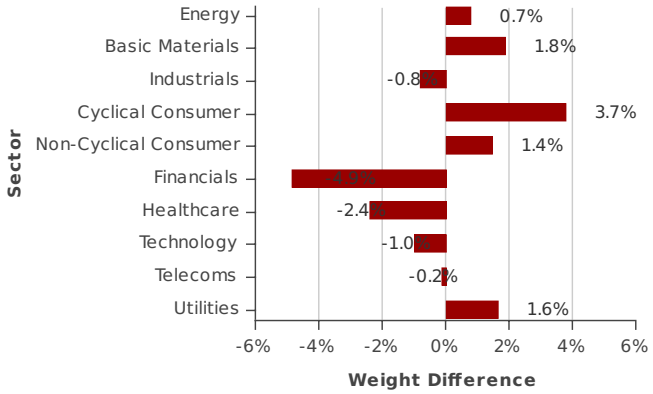
Sector Allocation as of 20-Mar-2015

The table shows the differences in aggregated sector weights of the index with regards to the cap-weighted reference index, based on the index's weight profile at the last rebalancing time.

SciBeta Dev HLiq MStrat	Excess Weight
Energy	0.7%
Basic Materials	1.8%
Industrials	-0.8%
Cyclical Consumer	3.7%
Non-Cyclical Consumer	1.4%
Financials	-4.9%
Healthcare	-2.4%
Technology	-1.0%
Telecoms	-0.2%
Utilities	1.6%

Sector Allocation as of 20-Mar-2015

The figure displays the differences in aggregated sector weights of the index with regards to the cap-weighted reference index, based on the index's weight profile at the last rebalancing time.



The sector classification used is the Thomson Reuters Business Classification.

Sector Performance Attribution

ERI Scientific Beta uses Menchero Multi-period attribution to breakdown the outperformance of a strategy with respect to its benchmark on a sector basis. Menchero Multi-period attribution, presented by Menchero (2004), breaks down the outperformance of the strategy index with regard to the cap-weighted reference index into three effects. The stock effect accounts for the share of outperformance attributable to the ability of the strategy to select profitable stocks, the sector effect accounts for the share attributable to the ability of the strategy to overweight sectors that outperform the reference index and the interaction effect accounts for the simultaneous action of the sector and stock effects. To learn more about the calculation details, please refer to the glossary term Menchero Multi-period attribution.

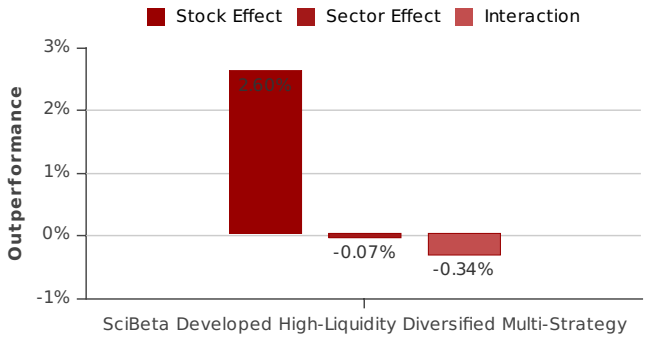
Sector Outperformance Attribution as of 31-Mar-2015

The table shows the results of Menchero Multi-period attribution, in which the index's outperformance with regard to its cap-weighted reference index is broken down into stock effect, sector effect, and interaction effect. The analysis is based on the selected period.

SciBeta Dev HLiq MStrat	Outperformance
Stock Effect	2.60%
Sector Effect	-0.07%
Interaction Effect	-0.34%

Sector Outperformance Attribution as of 31-Mar-2015

The figure displays the breakdown of the index's outperformance with regard to its cap-weighted reference index into returns attributed to stock effect, sector effect, and interaction effect from the Menchero Multi-period Attribution model. The analysis is based on the selected period.



Please see Menchero Multi-period attribution in the glossary for a detailed explanation on the attribution model. The sector classification used is the Thomson Reuters Business Classification. The statistics of historical performance are annualised.

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