iSTOXX® Europe Single & Multi-Factor Indices

March 2017

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Agenda

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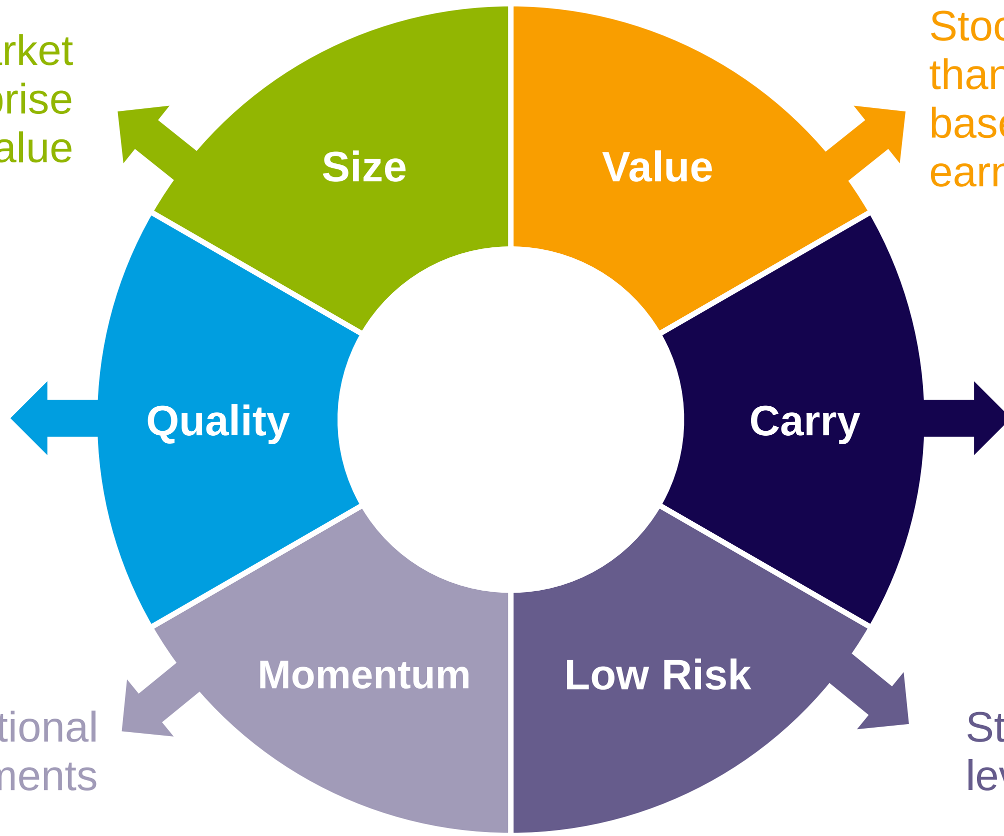
1. ISTOXX EUROPE SINGLE AND MULTI- FACTOR INDICES

Single Factors overview

The iSTOXX Europe Single Factor Indices exploit 6 different dimensions

Stocks with low market capitalization/enterprise value

Stocks that trade for less than their intrinsic values based on cash flow and earnings per share



Stocks with solid financial background based on debt coverage, earnings and others metrics

Stocks with high growth potential based on earnings and dividends

Stocks with exceptional historical price movements

Stocks with volatility levels below average

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Each single factor is a combination of sub-factors

Factor definition

Step-by-step procedure

» For each constituent, a set of ratios/sub-factors are calculated according to specific screening criteria tailored for each individual factor under consideration.

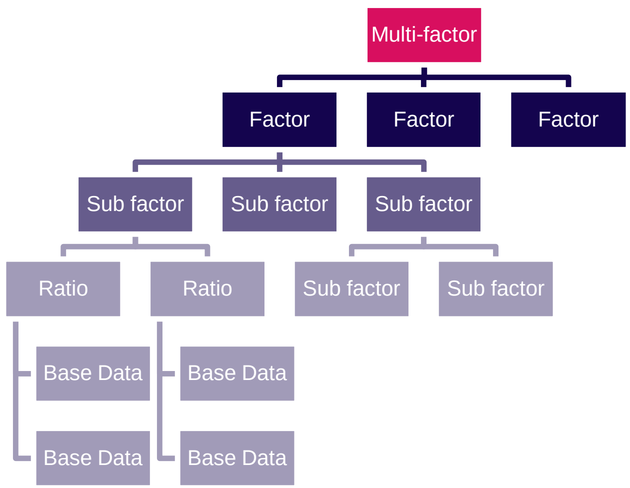
» A ranking process takes place, ranking the constituents among their supersectors[1)] and allocating a factor score to each, which is being neutralized by use of the normal distribution, to simplify the comparison.

» A multi-factor score is ultimately calculated for each constituent based on the individual factor scores that derived in the previous step.

Screening criteria

Factor	Sub-factor / Ratio
Carry	• Price/Dividend • Internal Growth • Earnings Dispersion • Shares outstanding reduction
Low Risk	• 3m Standard Deviation • 12m Standard Deviation • 12m Semi Deviation
Momentum	• 1m momentum reversal • 12m momentum
Quality	• Operating Income/Common Equity • Cash/Current Liabilities • Net external financing • Quality coverage[2)] • Accruals quality
Size	• Inverse market capitalization • Inverse enterprise value
Value	• Forward earnings yield (12 m) • Cash-flow yield

Combination of factors



1) ICB Supersectors
2) Quality coverage consists of 4 components: i) interest coverage, ii) EBIT/Total debt, iii) CFO/Interest payments, iv) CFO/Total debt

The optimization aims at maximizing the exposure to the targeted factor while subjecting itself to a series of constraints

Overview – Optimization approach

Optimization approach

» The selection as well as the determination of component weights is jointly estimated based on an optimization approach.

» The optimization aims at maximizing the exposure to the targeted factor while subjecting itself to a series of constraints that are chosen in order to achieve the best tradeoff between tradability and factor replication.

Overview - constraints

» maximum **tracking error** of **3%** relative to STOXX Europe 600,
» maximum **systematic risk contribution** of **10%** to tracking error,
» **targeted beta** of **1** relative to STOXX Europe 600 with allowed maximum deviation of +/- 0.025,
» number of **components** between **50 and 120**,
» components are **capped** according to **4.5%/8%, 35% rule,**
» **industry weights** cannot deviate from those of the STOXX Europe 600 by more than **+/- 1.5%,**
» **one-way turnover** per month is set to a maximum of **25%,**
» **liquidity constraint** on constituent level, defined by ((x bn * weight) / value traded) needs to be below y.

The iSTOXX Europe Multi-Factor Index aims to maximize the exposure to the aggregated factor score

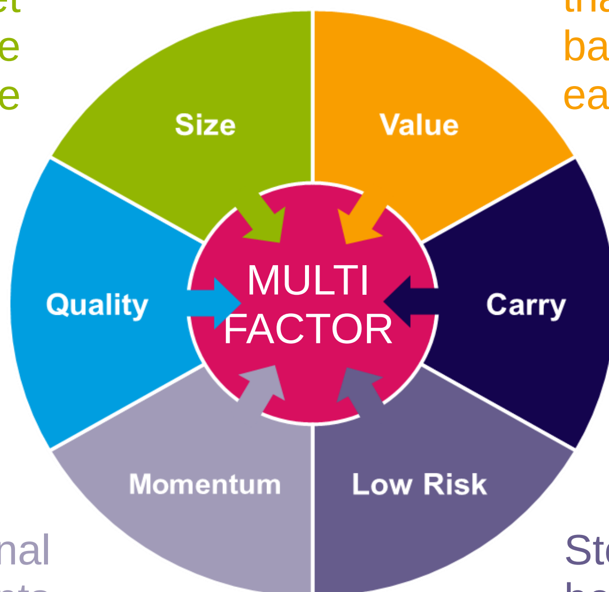
Overview

Stocks with low market capitalization/enterprise value

Stocks that trade for less than their intrinsic values based on cash flow and earnings per share

Stocks with solid financial background based on debt coverage, earnings and others metrics

Stocks with high growth potential based on earnings and dividends



Stocks with exceptional historical price movements

Stocks with volatilities levels below average

$$\text{Multi Factor} = \frac{\text{Carry} + \text{Low Risk} + \text{Momentum} + \text{Quality} + \text{Size} + \text{Value}}{6}$$

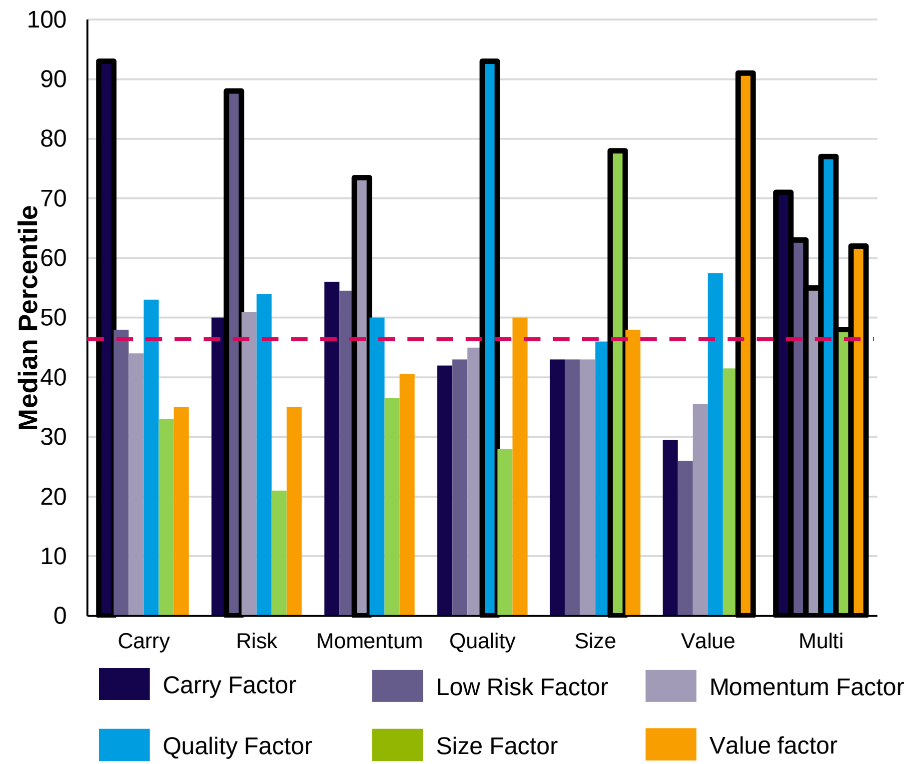
The iSTOXX Europe Multi-Factor approach selects companies with an above median exposure to all factors

Aggregated factor exposures

Simple combination of factor indices

» Companies selected into a respective single factor index score highest on the factor in focus while the average exposure to non-targeted factors are mostly below the median
» With the exception of the size factor, median percentiles of companies from the iSTOXX Europe Multi-Factor Index are above 50
» The multi-factor index tends to select the “hidden champions”, i.e. those companies that score relatively well in most of the targeted risk dimensions, rather than exceptionally well in just one dimension but below average in the respective others
» Thus, companies selected into the iSTOXX Europe Multi-Factor index tend to offer a diversified exposure to all factors

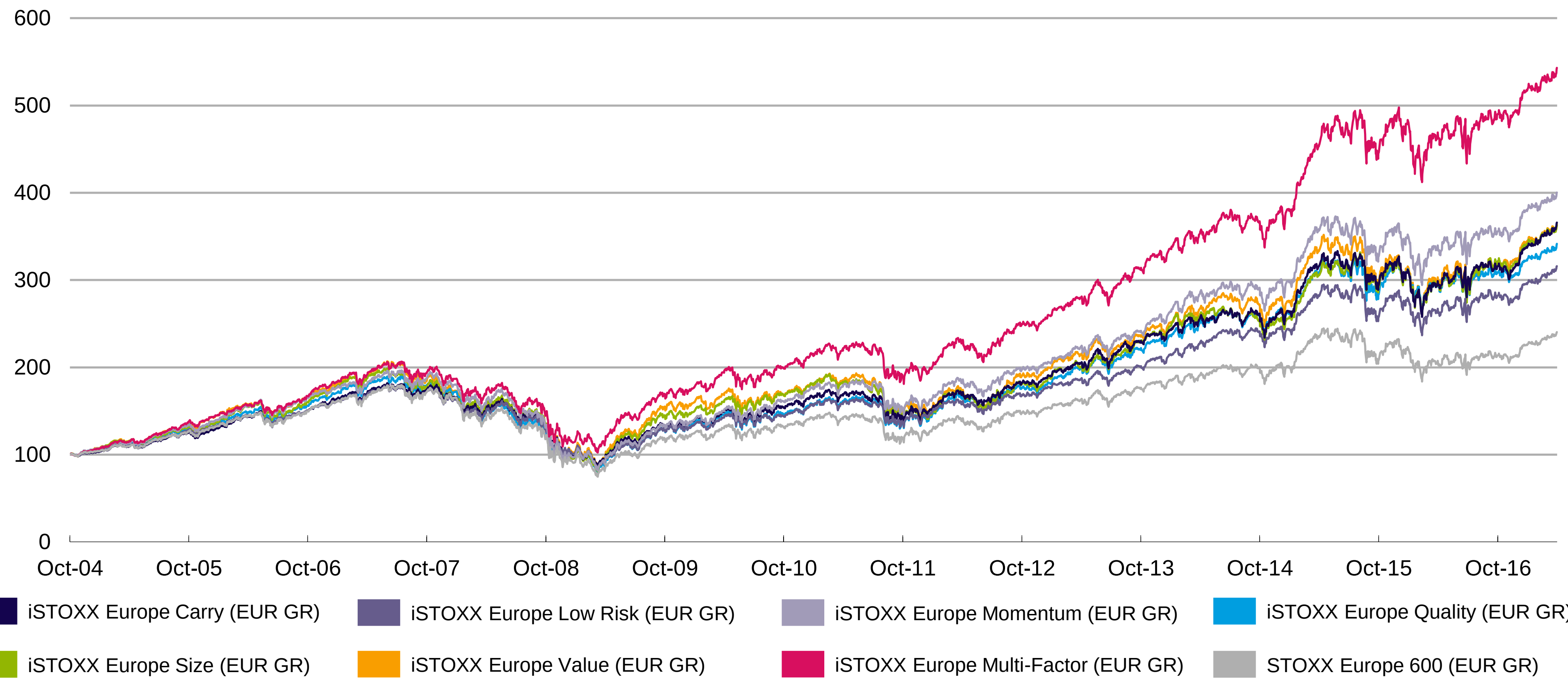
Median Percentile of Normalized Score



iSTOXX Europe Factor indices generated excess returns over the broad market over time

Optimized against the STOXX Europe 600

Historical values



1) Source: STOXX backtested data as from Oct. 1, 2004 to Mar. 31, 2017

iSTOXX Europe Factor indices show impressive excess returns over the broad market over time

Optimized against the STOXX Europe 600

Performance

Key figures[1)]	iSTOXX Europe Carry	iSTOXX Europe Low Risk	iSTOXX Europe Momentum	iSTOXX Europe Quality	iSTOXX Europe Size	iSTOXX Europe Value	iSTOXX Europe Multi-Factor	STOXX Europe 600
1y return	22.59%	18.62%	18.06%	15.33%	21.70%	20.26%	15.98%	16.35%
3y return	12.29%	11.24%	11.70%	10.54%	11.35%	10.50%	14.94%	7.77%
5y return	16.12%	14.27%	16.43%	15.10%	15.84%	15.59%	18.29%	11.16%
1y volatility	15.37%	14.25%	15.05%	15.18%	15.64%	16.28%	14.60%	15.40%
3y volatility	16.94%	15.19%	16.79%	16.73%	16.12%	17.27%	15.72%	17.54%
5y volatility	15.44%	13.80%	15.33%	15.25%	14.94%	15.80%	14.38%	15.97%
Maximum drawdown	52.81%	53.59%	58.40%	58.06%	59.13%	59.30%	50.42%	58.37%
3y Sharpe ratio	0.78	0.79	0.75	0.69	0.76	0.67	0.97	0.52
1y Gross Dividend Yield	3.02%	3.97%	3.63%	3.56%	3.91%	4.57%	2.98%	3.95%

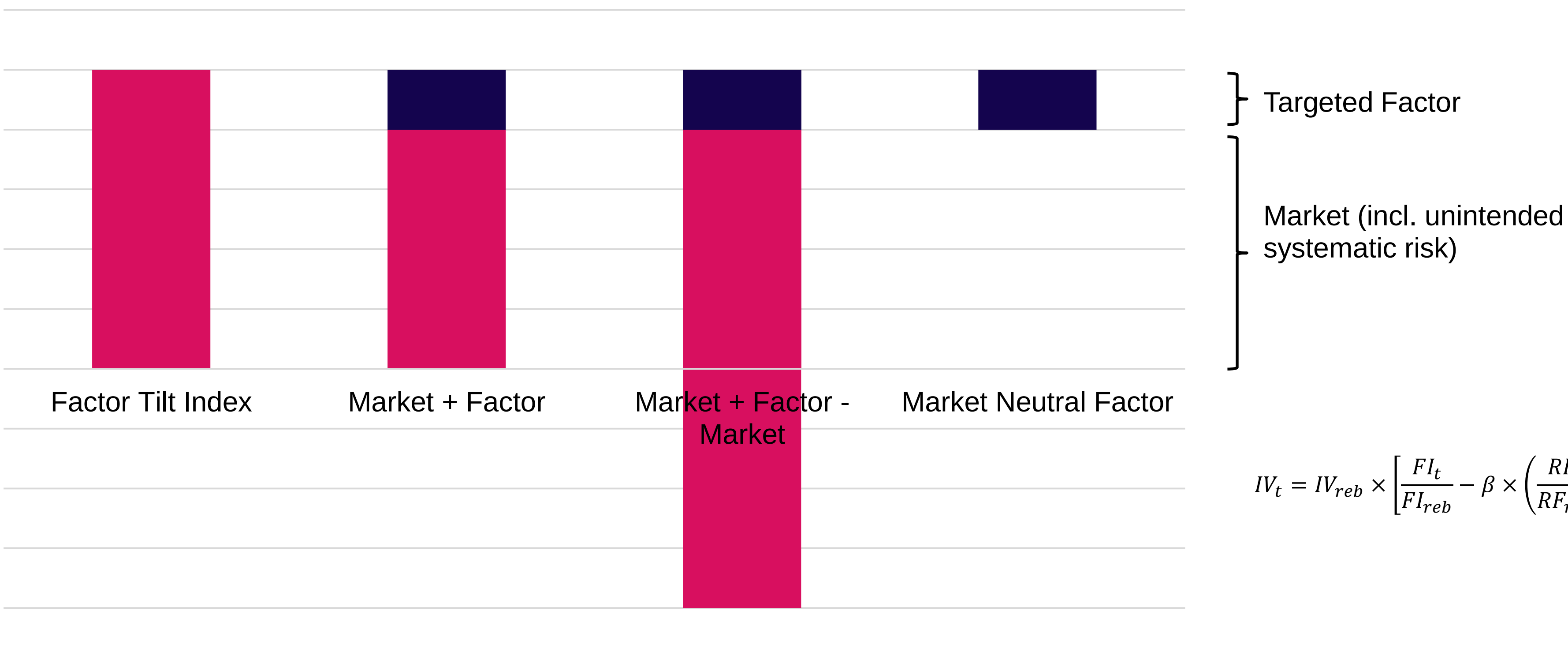
1) Source: STOXX backtested data as from Oct. 1, 2004 to Mar 31, 2017. Annualized figures since inception. Sharpe ratio calculated by using the EONIA rate. Gross Dividend Yield calculated by using annualized performance figures since inception; calculated as GR version minus the Price version.

2. MOVING FROM LONG ONLY TO MARKET NEUTRAL

From indices with factor tilt to market neutral factor indices (I)

Constructing market neutral factor indices

Graphical representation of factor extraction

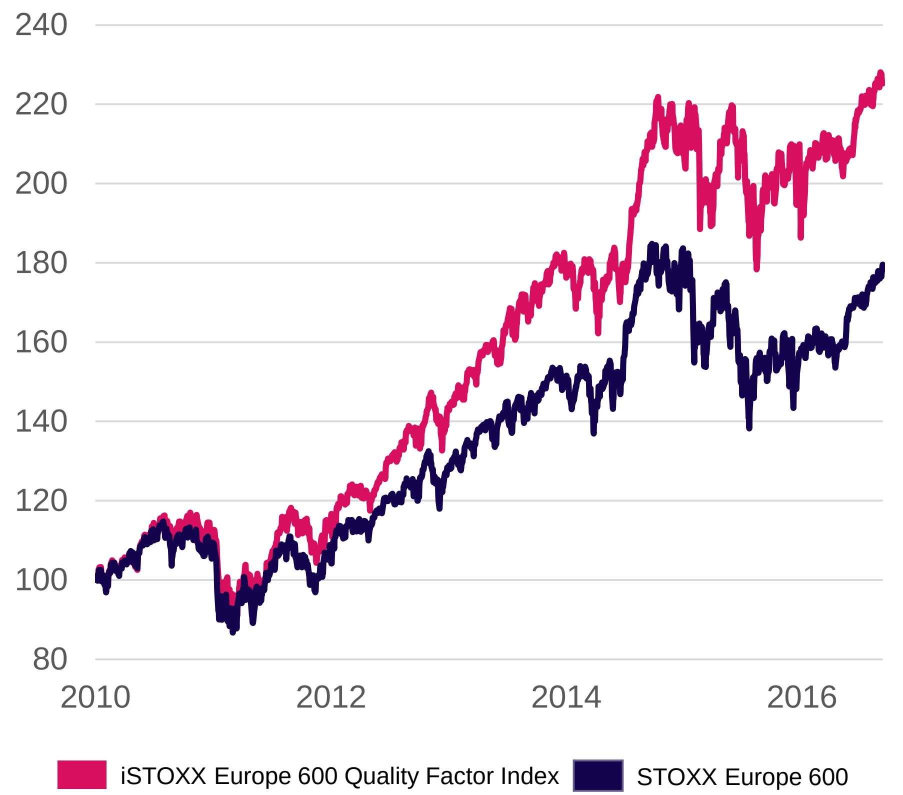


$$IV_t = IV_{reb} \times \left[\frac{FI_t}{FI_{reb}} - \beta \times \left(\frac{RF_t}{RF_{reb}} - 1\right)\right]$$

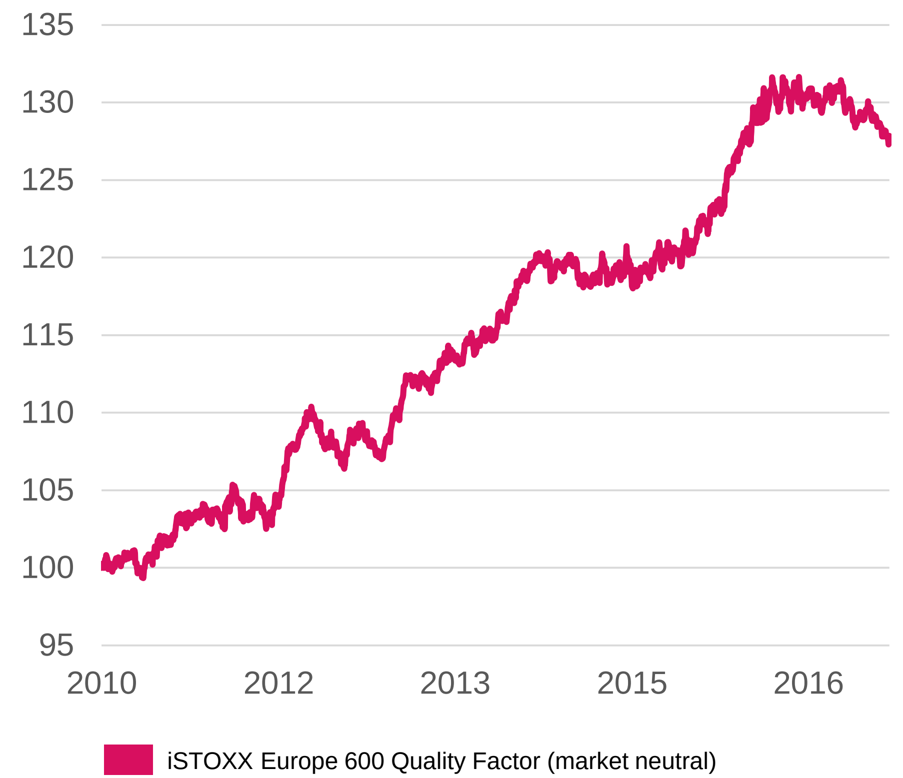
From indices with factor tilt to market neutral factor indices (II)

Constructing market neutral factor indices

Perf.: market + premium [Oct. 2004 - Jan. 2017][1)]



Perf.: premium [Oct. 2004 - Jan. 2017][1)2)]

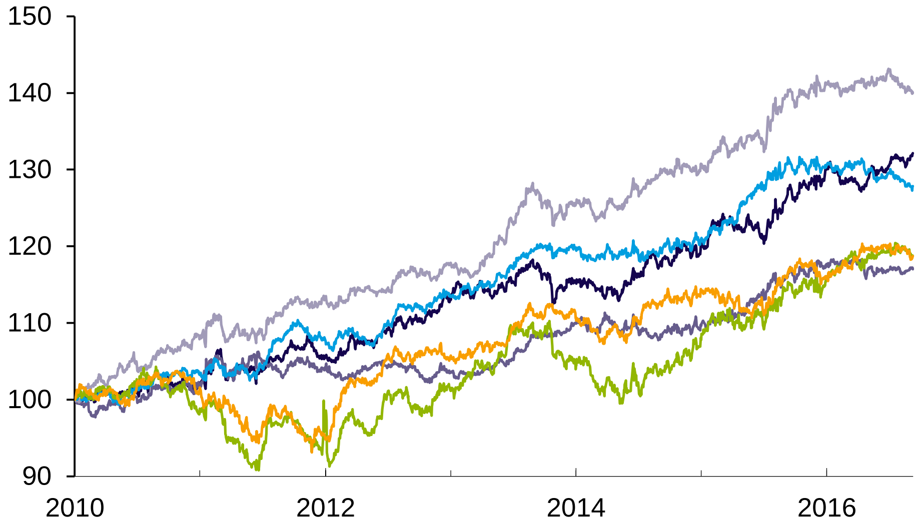


1) Factor returns are calculated in EUR NR
2) The iSTOXX® Europe Single/Multi Factor Market Neutral indices aim at investing into the existing iSTOXX® Europe Single/Multi Factor equity indices while holding a short position into the STOXX® Europe 600 Futures Roll index

Market neutral factor indices allow to extract the pure factor premium

Market neutral factor returns

Significant source of return



Historical development of factor returns[1)]

iSTOXX Market Neutral Single Factor Indices	Performance (p.a.)	Annualized volatility	Correl. to STX Eur 600
Carry	4.13%	4.34%	-0.21
Low Risk	2.31%	4.09%	-0.57
Momentum	5.01%	4.17%	-0.19
Quality	3.64%	3.90%	-0.22
Size	2.53%	6.88%	-0.30
Value	2.52%	4.76%	-0.06

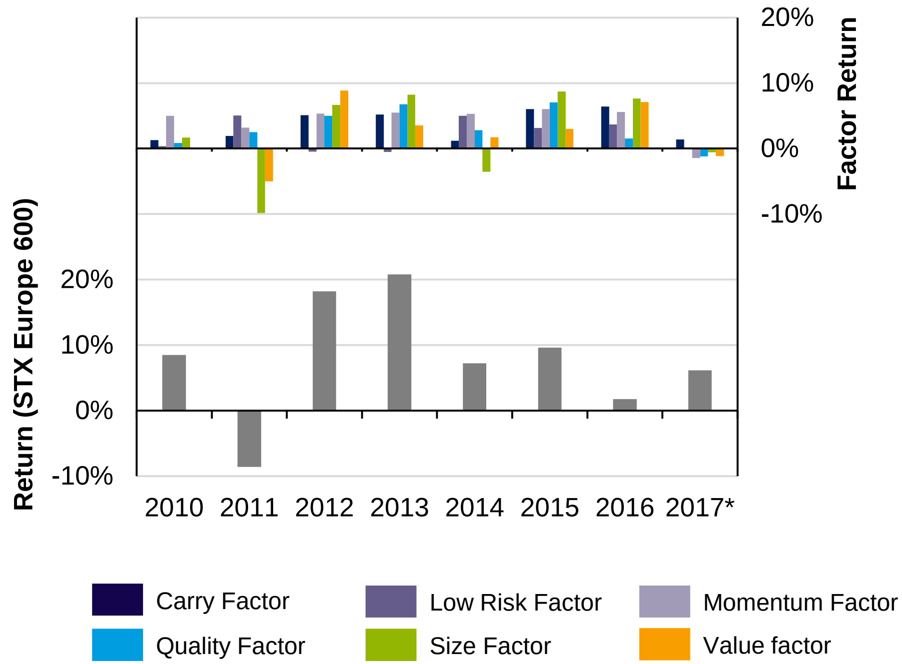
» Systematic exposure to style factors (value, size, quality, momentum, risk and carry) has been rewarded by additional return which led to the development of market-neutral factor indices
» However, factor returns are found to fluctuate over time

1) Time period ranging from Jul. 23, 2010 to Mar. 31, 2017

Market neutral factor returns are found to fluctuate over time

Performance and correlations

Factor returns [Jul. 2010 – Mar. 2017]



Correlation among factor returns[1)]

iSTOXX Market Neutral Single Factors	Carry	Low Risk	Momentum	Quality	Size	Value
Carry		0.55	0.67	0.62	0.57	0.41
Low Risk	0.55		0.57	0.61	0.54	0.39
Momentum	0.67	0.57		0.61	0.54	0.39
Quality	0.62	0.61	0.61		0.55	0.52
Size	0.57	0.54	0.54	0.55		0.54
Value	0.41	0.39	0.39	0.52	0.54	
Average	**0.56**	**0.53**	**0.55**	**0.58**	**0.55**	**0.45**

- » Correlations among factor premia are comparably low
- » They range from a minimum of 0.39 between Value and Low Risk to a maximum of 0.67 between Carry and Momentum

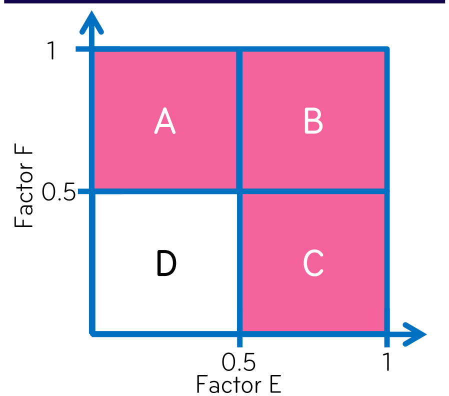
1) Performance of iSTOXX Europe Market Neutral indices and annual return of STOXX Europe 600, all measured in EUR – NR. Time period: Jul. 2010 – Mar. 2017

Different ways to construct a multi-factor index possible

Multi-Factor Index Construction

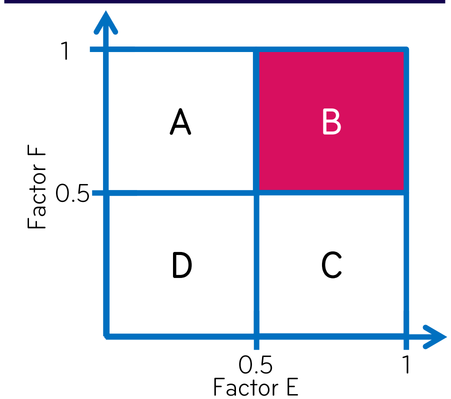
Construction of multi-factor indices

"Index of indices"



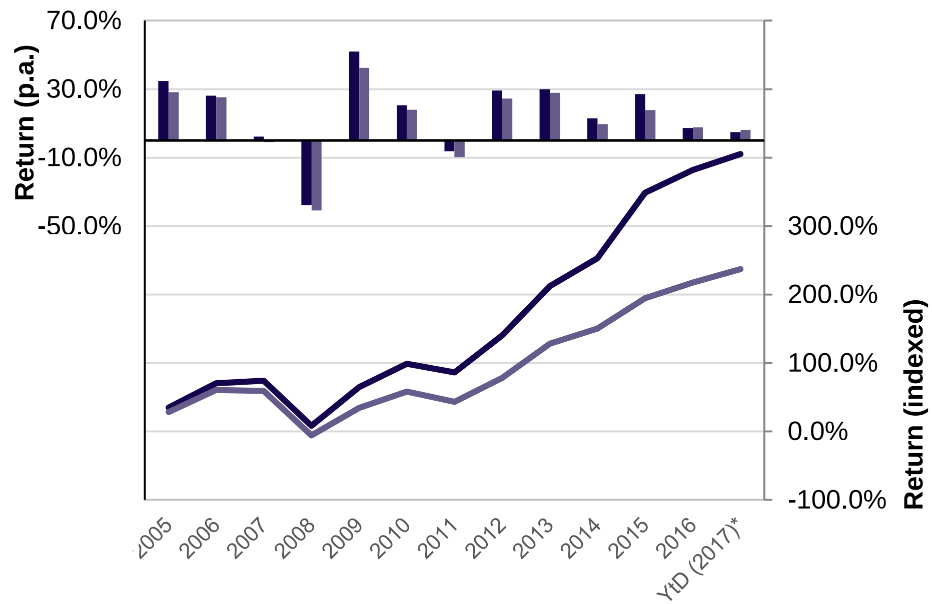
- Leads to very high and very low exposures to factors

Simult. maximization



- Only companies that score high in both factor dimensions

Perf. of iSTOXX Europe Multi-Factor Index[1)]



- With an overall performance of 405% measured from Jan. 2005 to Mar. 2017, the iSTOXX Europe Multi-Factor Index outperforms substantially compared to a simple, e.g. equal-weighted combination of single-factor indices (which generated a performance of just 237%)

1) Annual and indexed performance of iSTOXX Europe Multi-Factor index (Multi-factor) compared to equal-weighted combination of single-factor returns (Simple Average) measured in EUR GR. Time period: Jan. 2005 to Mar. 2017.

APPENDIX

Partners

Alpha Centauri models use FIS investment Risk Arbitrage Pricing Theory solution

FIS Investment Risk Solution (APT)

» Provides award-winning investment technology for multi-asset class risk management, analytics and risk reporting, serving buy-side institutions globally
» Market risk and liquidity risk across both liquid and illiquid asset classes, supporting regulatory reporting, portfolio optimization
» Customers range from institutional asset managers, pension funds, hedge funds, private banks, wealth managers, sovereign wealth funds and life insurance firms.

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Alpha Centauri

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» Risk competence and financial index know-how based on a unique in-house infrastructure to fully address client needs
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