IISL

India Index Services & Products Ltd.

NIFTY Multi-Factor Indices

Methodology Document

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Introduction

NIFTY Multi-Factor Index series includes indices that are designed to reflect the performance of portfolio of stocks selected based on combination of 2 or more factors such as Quality, Value, Alpha and Low Volatility.

Investments where stocks are screened based on multiple factors have gained popularity among global investment community. By combing the well-established factors used in active investment and rules based frame work of passive investment, factor indices tend to deliver risk premium in long term in a transparent, rule-based and cost effective manner. IISL maintains various indices based on single factors including Alpha, Quality, Low Volatility and Value. Below is the list of newly launched NIFTY multi-factor indices

1. NIFTY Alpha Low-Volatility 30
2. NIFTY Quality Low-Volatility 30
3. NIFTY Alpha Quality Low-Volatility 30
4. NIFTY Alpha Quality Value Low-Volatility 30

The multi-factor indices intend to capture the long term risk premia by diversification across 4 factors namely: Alpha, Quality, Low Volatility and Value. By doing so, it intends to counter the cyclicality of single factor index strategy and provides investors a choice to take exposure to multiple factors through a single index product.

Highlights

- The index series has a base date of April 01, 2005 and a base value of 1000

- Stocks from NIFTY 100 and NIFTY Midcap 50 at the time of review are eligible for inclusion in the indices

- Indices consist of well diversified portfolio of 30 stocks selected based on combination of 2 or more factors from the 4 factors – Alpha, Quality, Value and Low-Volatility

- Stock selection and weights are derived from factor scores resulting in portfolio capturing the essence of underlying factor dynamics

- With threshold mechanism that lays down stringent criteria for inclusion and exclusion, the index seeks to minimize degree of churning and replication cost

Methodology

Eligibility criteria

- All constituents forming part of NIFTY 100 and NIFTY Midcap 50 at the time of review are eligible for inclusion in the index
- Constituents should have a minimum listing history of 1 year

Stock Selection and stock weights:

Composition of single factors:

Factors	Alpha	Quality	Value	Low Volatility
Parameters	- High Jensens Alpha	- High ROE - Low Debt Equity ratio -Average Change in PAT	- High ROCE - High Dividend Yield - Low P/E - Low P/B	- Low standard deviation of price returns
Data source	Previous one year stock prices	Annual Report	Annual Report	Previous one year stock prices
Condition	Company should have pricing history of atleast 1 year	Company should have reported postive PAT in previous 3 financial years	Company should have reported postive PAT in previous 1 financial year	Company should have pricing history of atleast 1 year

Computation of single factor scores

Single Factors	Stock Selection and weighing process			
	Parameter score	Weighting	Factor level Z score	Factor level percentile score
Quality	Return on Equity	40%	Aggregate Quality Z score	Percentile Distribution of Quality Z score
	Debt to Equity Ratio	40%		
	Average PAT Change in 3 years	20%		
Value	Price to Earnings Ratio[*1]	30%	Aggregate Value Z score	Percentile Distribution of Quality Z score
	Price to Book Value Ratio[*1]	20%		
	Return on Capital Employed[*1]	40%		
	Dividend Yield[*1]	10%		
Alpha	Jensen's Alpha based on CAPM	100%	Alpha Z score	Percentile Distribution of Alpha Z score
Low Volatility	Inverse of Standard deviation of daily price returns	100%	Low Vol Z score	Percentile Distribution of Low Volatility Z score

[*1] Refer to annexure for details on different weight combinations used for the calculation of value z score

Factor Weights in Multi-factor Indices

Index	Factors Weights				Selection	Weights
	Alpha	Low-Vol.	Quality	Value	Top 30 stocks based on weighted average percentile score	Based on weighted average factor level Z Score. Weights of stocks are capped at 8%
NIFTY Alpha Low-Volatility 30	50%	50%	-	-		
NIFTY Quality Low-Volatility 30	-	50%	50%	-		
NIFTY Alpha Quality Low-Volatility 30	33.33%	33.33%	33.33%	-		
NIFTY Alpha Quality Value Low-Volatility 30	25%	25%	25%	25%		

Reconstitution & Rebalancing criteria

- The Indices will be reconstituted semi-annually
- Top 10 stocks based on average percentile score are compulsorily included in the index
- An existing constituent is compulsorily excluded if its rank based on Average percentile score drops below 50
- Weights may drift between rebalancing due to movement in stock prices
- Apart from the scheduled review, additional ad-hoc reconstitution and rebalancing of the index will be initiated in case any of the index constituents under goes suspension, delisting or scheme of arrangement

Calculation Frequency:

The index is calculated on an end of day basis for all days National Stock Exchange of India is open for trading in equity shares.

Index Governance:

IISL Board has constituted the Index Policy Committee (IPC) to formulate policies governing IISL indices. In addition to IPC, two committees viz. Index Maintenance Sub Committee (IMSC) and Debt Index Management Committee (DIMC) have been constituted. The IMSC is responsible for periodic review of equity indices based on the policies/ guidelines formulated by the IPC. DIMC takes decisions on the debt indices at IISL.

Annexure:

Factor Mathematics

Z score of factors considered for the index are calculated based on the weighted average Z score of underlying parameter which is discussed below.

1) Quality Factor:

- Quality Z score is calculated on the basis of Return on equity (ROE), Debt equity ratio (D/E) and Average change in PAT in previous 3 financial year.
- Companies which incurred loss (negative PAT) in any of previous 3 financial years are excluded from the index.
- Average weighted Z score is calculated for all securities as per the following formula:

    *Quality Z score= 0.4 * Z score of ROE + 0.4 * (-Z score of D/E) + 0.2 * Z score of % PAT increase*

2) Value Factor:

- Value Z score are calculated on the basis of ROCE (Return on Capital Employed), PE, PB and Dividend yield (DY)
- Average weighted Z score is calculated for all securities as per the following formula

    *Value Z score= 0.3 * (-Z score of P/E) + 0.2 * (-Z score of P/B) + 0.4 * (Z Score of ROCE) + 0.1 *(Z score of Div. Yield)*

- In case quality is also one of the factor in the index then average weighted Z score is calculated for all securities as per the following formula

    *Value Z score= 0.3 * (-Z score of P/E) + 0.3 * (-Z score of P/B) + 0.2 * (Z Score of ROCE) + .2 *(Z score of Div. Yield)*

3) Low Volatility Factor:

- Low Volatility Z score is calculated using the inverse of Std. deviation based on previous 1 year prices returns

4) Alpha Factor:

- Alpha Z score is calculated for all securities on the basis of Jensen's Alpha based on previous 1 year prices, where market portfolio is NIFTY 50.

  Calculation of Alpha: $\alpha_s = r_s - [r_f + \beta_s (r_m - r_f)]$

  α_s: Alpha of the stock

  r_s: Average of daily return of security during previous 12 months

  r_f : Average of daily 3 Month MIBOR rate during previous 12 months

  r_m : Average of daily return of index i.e. NIFTY 50

  β_s : Beta of the security calculated based on previous 12 month period.

Z score of the factors are converted into Factor score based on the following formula

Factor Score = (1+ Average Z score) if Avg. Z score >0

1/ (1-Average Z score) if Avg. Z score < 0

Percentile score is calculated from the factor score for every eligible security with security having the highest factor score getting the highest percentile score.

About National Stock Exchange of India Limited (NSE):

The National Stock Exchange (NSE) is the leading stock exchange in India and the fourth largest in the world by equity trading volume in 2015, according to World Federation of Exchanges (WFE). NSE was the first exchange in India to implement electronic or screen-based trading. It began operations in 1994 and is ranked as the largest stock exchange in India in terms of total and average daily turnover for equity shares every year since 1995, based on SEBI data.

NSE has a fully-integrated business model comprising our exchange listings, trading services, clearing and settlement services, indices, market data feeds, technology solutions and financial education offerings. NSE also oversees compliance by trading and clearing members with the rules and regulations of the exchange.

NSE is a pioneer in technology and ensures the reliability and performance of its systems through a culture of innovation and investment in technology. NSE believes that the scale and breadth of its products and services, sustained leadership positions across multiple asset classes in India and globally enable it to be highly reactive to market demands and changes and deliver innovation in both trading and non-trading businesses to provide high-quality data and services to market participants and clients.

About India Index Services & Products Ltd. (IISL):

India Index Services & Products Ltd. (IISL), a subsidiary of NSE, provides a variety of indices and index related services for the capital markets. IISL focuses upon the index as a core product. IISL owns and manages a portfolio of indices under the NIFTY brand of NSE, including the flagship index, the NIFTY 50. IISL equity Indices comprises of broad-based benchmark indices, sectoral indices, strategy indices, thematic indices and customised indices. IISL also maintains fixed income indices based on Government of India securities, corporate bonds and money market instruments. Many investment products based on IISL indices have been developed within India and abroad. These include index based derivatives traded on NSE, Singapore Exchange Ltd. (SGX), Chicago Mercantile Exchange Inc. (CME), Osaka Exchange Inc. (OSE), Taiwan Futures Exchange (TAIFEX) and a number of index funds and exchange traded funds. The flagship 'NIFTY 50' index is widely tracked and traded as the benchmark for Indian Capital Markets.

For more information, please visit: www.nseindia.com

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