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MSCI Adaptive Multiple-Factor Indexes

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Contents

1 Introduction

MSCI Adaptive Multiple-Factor Indexes are constructed by a top-down combination of indexes with allocation weights that may change at each index review based on the relative strength of four signals: Macro, Momentum, Valuations and Sentiment. MSCI Adaptive Multiple-Factor Momentum Signal Indexes are constructed by a top-down combination of indexes with allocation weights that may change at each index review based on the relative strength of Momentum signal. The MSCI Adaptive Multiple-Factor Indexes and MSCI Adaptive Multiple-Factor Momentum Signal Indexes described in this methodology book are designed to represent the performance of a strategy of combining individual MSCI Factor Indexes in a single index. The methodology framework can be extended to create customized combinations (e.g., using a subset of the signals, using a subset of the underlying MSCI Factor Indexes or change in frequency of rebalancing etc.) of the underlying MSCI Factor Indexes.

2 Constructing the MSCI Adaptive Multiple-Factor Indexes

2.1 DETERMINING THE COMPONENTS OF THE MSCI ADAPTIVE MULTIPLE-FACTOR INDEXES

The MSCI Adaptive Multiple-Factor Indexes are constructed as a combination of six MSCI Factor Indexes [1] ("Component Indexes").

1. MSCI Minimum Volatility Index [2]
2. MSCI High Dividend Yield Index [3]
3. MSCI Quality Index [4]
4. MSCI Momentum Index [5]
5. MSCI Enhanced Value Index [6]
6. MSCI Equal-Weighted Index [7]

These component Indexes are combined in the proportion of weights that are determined at each index review of the MSCI Adaptive Multiple-Factor Index.

2.2 DETERMINING THE CONSTITUENTS OF THE MSCI ADAPTIVE MULTIPLE-FACTOR INDEXES

All constituents of each Component Index are included in the MSCI Adaptive Multiple-Factor Index.

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[1] https://www.msci.com/msci-factor-indexes
[2] https://www.msci.com/index/methodology/latest/MinVol
[3] https://www.msci.com/index/methodology/latest/HDY
[4] https://www.msci.com/index/methodology/latest/Quality
[5] https://www.msci.com/index/methodology/latest/Momentum
[6] https://www.msci.com/index/methodology/latest/EV
[7] https://www.msci.com/index/methodology/latest/EW

2.3 DETERMINING THE WEIGHTS OF THE CONSTITUENTS OF THE MSCI ADAPTIVE MULTIPLE-FACTOR INDEXES

The weight of each security in the MSCI Adaptive Multiple-Factor Index is determined based on:

- the security's weight in each underlying Component Index
- the target weight of each underlying Component Index in the MSCI Adaptive Multiple-Factor Index

The weight is calculated as follows:

$$W_{Sec_i}^{AMF} = \sum_{C_j} W_{C_j}^{AMF} * W_{Sec_i}^{C_j}$$

Where:

- $W_{Sec_i}^{AMF}$ is the weight of security Sec_i in the MSCI Adaptive Multiple-Factor Index
- $W_{C_j}^{AMF}$ is the target weight of the Component Index C_j in the MSCI Adaptive Multiple-Factor Index
- $W_{Sec_i}^{C_j}$ is the weight of security Sec_i in the Component Index C_j

For the ongoing maintenance of MSCI Adaptive Multiple-Factor Index, a Component Index Constraint Factor and a Full Market Cap Adjustment Factor is calculated for each Component Index and MSCI Adaptive Multiple-Factor Index constituent respectively.

2.3.1 CALCULATION OF THE COMPONENT INDEX CONSTRAINT FACTOR

At each index review, a Component Index Constraint Factor is calculated for each Component Index as follows:

$$CCF_{C_j}^{AMF} = {W_{C_j}^{AMF}} \Big/ \left(\frac{IndexMcap_{C_j}}{\sum_{C_j} IndexMcap_{C_j}}\right)$$

Where:

- $CCF_{C_j}^{AMF}$ is the Component Index Constraint Factor of the Component Index C_j
- $IndexMcap_{C_j}$ is the index market capitalization of the Component Index C_j

The component constraint factor does not change between Index Reviews.

2.3.2 CALCULATION OF THE SECURITY FULL MARKET CAP ADJUSTMENT FACTOR

The Full Market Cap Adjustment Factor for each security in the MSCI Adaptive Multiple-Factor Index is then calculated as follows:

$$FMCAF_{Sec_i}^{AMF} = \sum_{C_j} CCF_{C_j}^{AMF} * FMCAF_{Sec_i}^{C_j}$$

Where:

- $FMCAF_{Sec_i}^{AMF}$ is the Full Market Cap Adjustment Factor of security Sec_i in the MSCI Adaptive Multiple-Factor Index
- $FMCAF_{Sec_i}^{C_j}$ is the Full Market Cap Adjustment Factor of security Sec_i in the Component Index C_j

2.3.3 DETERMINING THE TARGET WEIGHT OF THE COMPONENT INDEXES

The target weight ($W_{C_j}^{AMF}$) of a Component Index (C_j) is an average of the Component Index weights determined based on the Macro, Momentum, Valuations and Sentiment signals.

The target weight of a Component Index is calculated as follows:

$$W_{C_j}^{AMF} = 0.25 * W_{MacroC_j} + 0.25 * W_{MomC_j} + 0.25 * W_{ValC_j} + 0.25 * W_{SentiC_j}$$

Where:

- W_{MacroC_j} is the weight of Component Index C_j determined based on Macro signal
- W_{MomC_j} is the weight of Component Index C_j determined based on Momentum signal
- W_{ValC_j} is the weight of Component Index C_j determined based on Valuations signal
- W_{SentiC_j} is the weight of Component Index C_j determined based on Sentiment signal

Please refer Appendix I for the detailed calculation of the weight of a Component Index from Macro, Momentum, Valuations and Sentiment signals.

3 Maintaining the MSCI Adaptive Multiple-Factor Indexes

3.1 QUARTERLY AND SEMI-ANNUAL INDEX REVIEWS

The MSCI Adaptive Multiple-Factor Indexes are reviewed on a quarterly basis, coinciding with the February, May, August and November Index Reviews of the MSCI Global Investable Market Indexes.

In general, MSCI uses macro, momentum, valuation and sentiment indicators as of the end of the month preceding the Index Reviews for the rebalancing of the Index. For macro indicators PMI and CFNAI, due to lag in published data, MSCI uses data as of the end of second month preceding the Index Reviews for the rebalancing of the Index.

The pro forma Index is typically announced nine business days before the effective date.

3.2 ONGOING EVENT-RELATED CHANGES

The maintenance of the MSCI Adaptive Multiple-Factor Indexes follows the maintenance of the Component Indexes. The Component Index Constraint Factor remains constant between Index Reviews. The Full Market Cap Adjustment Factor of each constituent security in the MSCI Adaptive Multiple-Factor Index is recalculated every day as per section 2.3.2. This Full Market Cap Adjustment Factor remains constant between Index Reviews, except for changes in the Full Market Adjustment Factors applied to the security in the underlying Component Indexes, as per the maintenance methodology of the Component Index. Any change in number of shares applied in the MSCI Global Investable Market Indexes due to corporate events is also reflected in the MSCI Adaptive Multiple-Factor Indexes.

Any security added to a Component Index is added simultaneously to the MSCI Adaptive Multiple-Factor Index. The addition is included with the Component Index Constraint Factors determined at the previous Index Review for the relevant components. The Full Market Cap Adjustment Factor is then determined as per section 2.3.2.

Any security deleted from all Component Indexes is simultaneously deleted from the MSCI Adaptive Multiple-Factor Index. Deletions from only some but not all of the Component Indexes result in a change in the Full Market Cap Adjustment Factor as per section 2.3.2.

Further detail and illustration regarding specific treatment of corporate events relevant to this Index can be found in the MSCI Corporate Events Methodology.

The MSCI Corporate Events methodology book is available at:
https://www.msci.com/index-methodology

3.3 DAILY TOTAL RETURN INDEXES

Daily Total Return (DTR) Indexes for the Adaptive Multiple-Factor Indexes are calculated based on the MSCI DTR Index Methodology. In particular, dividends from constituents of an MSCI Adaptive Multiple-Factor Index are reinvested in the whole Index (as opposed to being reinvested only in the particular Component Indexes to which the constituent belongs).

4 Appendix I

The weight of a Component Index within each signal is determined as follows:

4.1 MACRO SIGNAL

Four economic "regimes" are defined by characterizing the prevailing market environment using the below macro indicators. Each regime is defined based on the 3-month average and 3-month vs 12-month moving average of the macro indicator. Exhibit 1 shows the definition of each regime based on the macro signal.

Exhibit 1: Macro Regimes

Macro Regime	Macro Signal
Recovery	(3-month average – 12-month average)>=0 and (3-month average) < 0
Expansion	(3-month average – 12-month average)>=0 and (3-month average) >= 0
Slow Down	(3-month average – 12-month average) <0 and (3-month average) >= 0
Contraction	(3-month average – 12-month average) <0 and (3-month average) < 0

Exhibit 2 shows the Component Indexes that are overweighted (2x) based on the regime defined by the macro indicator.

Exhibit 2: Overweighted Component Indexes for the Macro regimes

	Recovery	Expansion	Slow Down	Contraction
Overweight	Enhanced Value	Enhanced Value	Minimum Volatility	Enhanced Value
	Equal-Weighted	Equal-Weighted	Quality	Quality
	High Dividend Yield	Momentum	Momentum	Minimum Volatility

Macro Indicators:

The macro indicators considered to define the macro signal are as follows:

1. US ISM Purchasing Managers Index [8] (PMI)
2. The Chicago Fed National Activity Index [9] (CFNAI)
3. The Federal Reserve Bank of Philadelphia ADS Index [10] (ADS)

[8] Source: Institute for Supply Management. A value of 50 is subtracted from PMI for calculation of averages.

[9] Source: Federal Reserve Bank of Chicago

[10] Source: Research Department, Federal Reserve Bank of Philadelphia

The Component Index weight for each macro indicator is defined by the regime. Overweighted Component Indexes are given 2/9th weight and the other Component Indexes are given 1/9th weight.
The Macro signal Component Index weight (W_{MacroC_j}) is an average of the Component Index (C_j) weight determined based on PMI, CFNAI and ADS indicators. If all the values of any macro indicator are missing, then the Macro signal Component Index weight is computed ignoring the missing macro indicator.

4.2 MOMENTUM SIGNAL

The momentum indicator is based on the last 3-month risk adjusted return of an individual Component Index (C_j). The 3-month risk adjusted return is calculated as 3-month return divided by standard deviation computed using the daily returns over three months. The Component Indexes are ranked on a cross-sectional basis where higher risk adjusted returns are assigned higher ranks.
The Momentum signal Component Index weights (W_{MomC_j}) are calculated in proportion to their respective ranks.

$$W_{MomC_j} = \frac{rank_{C_j}}{\sum_{C_j} rank_{C_j}}$$

4.3 VALUATION SIGNAL

The valuation spread is computed as the valuation of the Component Index (C_j) relative to the harmonic mean of six Component Indexes. The prevailing valuation spread of the Component Index is compared with its own history. This measure is then ranked on a cross-sectional basis where the Component Indexes with lower valuations are assigned higher ranks. The Component Index weight for each valuation indicator ($W_{Val_kC_j}$) is calculated in proportion to its respective rank.

$$W_{Val_kC_j} = \frac{rank_{C_j}}{\sum_{C_j} rank_{C_j}}$$

Valuation Indicators:
The Component Index weight for each valuation indicator is calculated as defined above. The valuation indicators considered are as follows:

1. Price to Earnings (P/E) [11]
2. Price to Book Value (P/B) [11]
3. Price to Cash Earnings (P/CE) [11]

[11] For details on the fundamental data, please refer to the MSCI Fundamental Data Methodology book available at: https://www.msci.com/index-methodology

If a Component Index has negative values in any given valuation indicator, then they are not considered in the calculation and that Component Index is assigned the lowest rank / weight.

The Valuation signal Component Index weight (W_{ValC_j}) is an average of the Component Index (C_j) weight determined based on P/E, P/B and P/CE indicators. If all the values of any valuation indicator are missing, then the Valuation signal Component Index weight is computed ignoring the missing valuation indicator.

4.4 SENTIMENT SIGNAL

Sentiment Indicators:

The sentiment indicators considered to define the sentiment signal are as follows:

1. VIX [12] / VIX3M [13]: CBOE Volatility Index divided by CBOE 3-month Volatility Index
2. Credit Spread [14]: ICE BofAML US Corporate BBB Option-Adjusted Spread

Three "regimes" are defined by characterizing the prevailing market sentiment using the above sentiment indicators. Exhibit 3 shows the definitions of regime based on the sentiment signal.

Exhibit 3: Sentiment Regimes

Sentiment Regime	Sentiment Signal
Risk-on	(Credit Spread - 12month average Credit Spread) < -0.25
	(VIX / VIX3M) < 0.975
Risk-off	(Credit Spread - 12m average Credit Spread) > 0.25
	(VIX / VIX3M) > 1.025
Stable	-0.25 <= (Credit Spread - 12month average Credit Spread) <= 0.25
	0.975 <= (VIX / VIX3M) <= 1.025

Exhibit 4 shows the Component Indexes that are overweighted (2x) based on the regime defined by the sentiment indicator.

[12] Source: Chicago Board Options Exchange (CBOE) Volatility Index

[13] Source: Chicago Board Options Exchange (CBOE) 3-Month Volatility Index

[14] Source: ICE BofAML Fixed Income Indices

Exhibit 4: Overweighted Component Indexes for the Sentiment regimes

	Risk on	Risk off	Stable
Overweight	Enhanced Value	Minimum Volatility	None
	Equal-Weighted	Quality	
	Momentum	High Dividend Yield	

The Component Index weight for each sentiment indicator is defined by the regime. Overweighted Component Indexes are given 2/9th weight and the other Component Indexes are given 1/9th weight in risk-on and risk-off regime. All Component Indexes are given 1/6th weight in the stable regime.

The Sentiment signal Component Index weight (W_{SentiC_j}) is an average of the Component Index (C_j) weight determined based on (VIX / VIX3M) and credit spread indicators. If all the values of any sentiment indicator are missing, then the sentiment signal Component Index weight is computed ignoring the missing sentiment indicator.

5 Appendix II: MSCI Adaptive Multiple-Factor Momentum Signal Indexes

MSCI Adaptive Multiple-Factor Momentum Signal Indexes are constructed by a top-down combination of indexes with allocation weights that may change at each index review based on the relative strength of the Momentum signal.

The component Indexes (as defined in section 2.1) are combined in the proportion of weights that are determined at each index review of the MSCI Adaptive Multiple-Factor Momentum Signal Index.

The weight of each security in the MSCI Adaptive Multiple-Factor Momentum Signal Index is determined based on:

- the security's weight in each underlying Component Index
- the target weight of each underlying Component Index in the MSCI Adaptive Multiple-Factor Momentum Signal Index

The weight is calculated as follows:

$$W_{Sec_i}^{Mom} = \sum_{C_j} W_{Mom C_j} * W_{Sec_i}^{C_j}$$

Where:

- $W_{Sec_i}^{Mom}$ is the weight of security Sec_i in the MSCI Adaptive Multiple-Factor Momentum Signal Index
- $W_{Mom C_j}$ is the target weight of the Component Index C_j in the MSCI Adaptive Multiple-Factor Momentum Signal Index which is computed as per section 4.2
- $W_{Sec_i}^{C_j}$ is the weight of security Sec_i in the Component Index C_j

The following sections have been modified since October 2019:

1. Introduction
   - Addition of the introduction of the MSCI Adaptive Multiple-Factor Momentum Signal Indexes

2. Appendix II: MSCI Adaptive Multiple-Factor Momentum Signal Indexes
   - Addition of the MSCI Adaptive Multiple-Factor Momentum Signal Indexes

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