Wilshire Indexes

FT Wilshire Style Index Series Methodology

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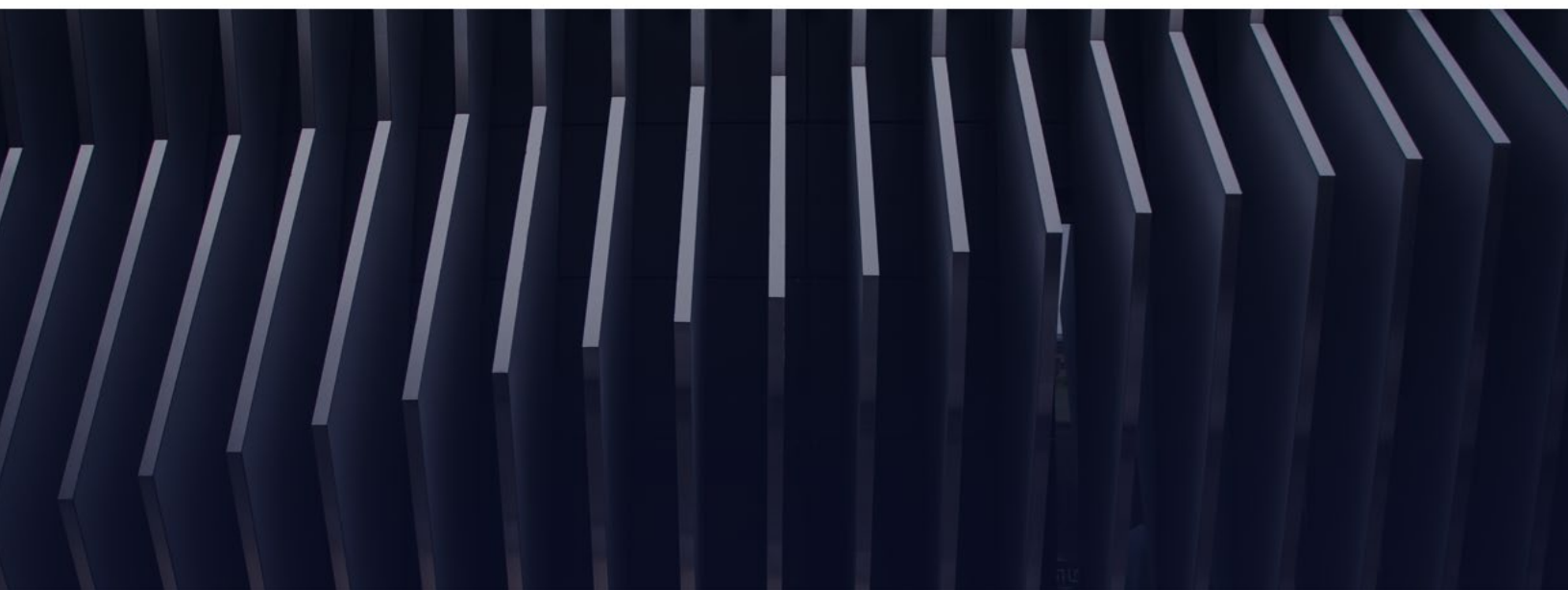
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1 Introduction

The FT Wilshire Style Indexes are designed to measure the performance of the Large Cap Value, Large Cap Growth, Small Cap Value and Small Cap Growth segments of the US market. The details of the index construction are set out below.

2 Index Construction

2.1 Constituents and Free Float Market Capitalization Weights

Constituents, free float, and shares are taken from post close updates on the third Friday of the reconstitution month. Price is defined as the closing price of the cutoff-date, adjusted for corporate actions between the cutoff-date and the post close updated data on third Friday of the reconstitution month.

A constituent's free float market capitalization is then defined as the product of its free-float, shares and adjusted cutoff price. A constituent's free float market capitalization weight is then defined by its free float market capitalization divided by the total free float market capitalization of the entire set of constituents.

2.2 Factor Definitions

The components of Value and Growth set out in this section are in broad consensus with those found in the academic literature. They have been chosen to reflect a balance between forward looking, trailing, long-term and short-term measures.

2.2.1 Book to Price Ratio (BP)

Book to Price Ratio is defined as company's trailing 12-month Book Value divided by its full Market Capitalization at the cutoff date

2.2.2 Cash Flow to Price Ratio (CP)

Cash Flow to Price Ratio is defined as company's trailing 12-month Net Operating Cash Flow divided by its full Market Capitalization at the cutoff date.

2.2.3 Forward Earnings to Price Ratio (FEP)

Forward Earnings to Price Ratio is defined as company's 12-month forward estimate of earnings per share divided by its price as of the cutoff date.

2.2.4 Long-Term Sales Growth (LSG)

Long-Term Sales Growth is defined as company's compound annual sales growth rate calculated over the last 5 years.

$$LSG_t = \left(\frac{Sales_t - Sales_{t-5}}{|Sales_{t-5}|} + 1 \right)^{1/5} - 1 \qquad (1)$$

where $Sales_t$ is company's annual Sales for fiscal year t.

2.2.5 Long-Term EBITDA Growth (LEG)

Long-Term EBITDA Growth is defined as company's compound annual EBITDA growth rate calculated over the last 5 years.

$$LEG_t = \left(\frac{EBITDA_t - EBITDA_{t-5}}{|EBITDA_{t-5}|} + 1 \right)^{1/5} - 1 \qquad (2)$$

where $EBITDA_t$ is company's annual EBITDA for fiscal year t.

2.2.6 Forecast Earnings Growth (FEG)

Forecast Earnings Growth is defined as the ratio of difference between the company's forward 12-month EPS and its trailing 12-month EPS to the absolute value the trailing 12-month EPS

2.3 Calculation of Composite Z-Scores

The quantities defined in Section 2.2 range over different scales. To put them on the same scale we subtract each quantity's cross-sectional mean from its raw value and then divide by its cross-sectional standard deviation. A winsorization process is then applied to ensure that all the results lay in the range -3 to +3. The resulting Z-scores are denoted by $Z_{F,i}$ where F is one of $\{BP, CP, FEP, LSG, LEG, FEG\}$.

Separate Value and Growth composite factors are calculated for each stock according to:

$$V_i = \text{Average}[Z_{BP,i}, Z_{CP,i}, Z_{FEP,i}] \quad \text{and} \quad G_i = \text{Average}[Z_{LSG,i}, Z_{LEG,i}, Z_{FEG,i}] \tag{3}$$

respectively, where the average is taken over the numerical values of the Z-scores. Where no numerical values exist for a given stock the composite is assigned to a null value. The normalization and winsorization process is reapplied to these composite quantities to yield Value and Growth Z-scores, $Z_{V,i}$ and $Z_{G,i}$, which have mean zero and standard deviation one.

A combined value-growth composite factor is defined by:

$$C_i = \text{Average}[Z_{V,i}, -Z_{G,i}] \tag{4}$$

Where both Value and Growth Z-scores are null values, the composite factor is set to zero. Finally, this is used to define a composite Z-score, $Z_{C,i}$, using the same normalization and winsorization process applied earlier.

2.4 Value and Growth Probability Scores

Value and Growth scores are defined by:

$$P_{V,i} = \Phi[Z_{C,i}] \quad \text{and} \quad P_{G,i} = \Phi[\text{-}Z_{C,i}] \tag{5}$$

where $\Phi[Z]$ is the cumulative normal function with standard deviation parameter set to 0.5, defined by:

$$\Phi[Z] = \sqrt{2/\pi} \int_{-\infty}^{Z} e^{-2x^2} \, dx \tag{6}$$

Note that, since $0 \leq \Phi[Z] \leq 1$ and $\Phi[Z] + \Phi[-Z] = 1$, we may interpret $P_{V,i}$ and $P_{G,i}$ as the "probability" that stock i is a Value or Growth stock. To improve the stability of probability estimation and prevent unnecessary turnover in the index, these probabilities are redefined by averaging them with those assigned at the previous reconstitution. Finally, to avoid assigning small probabilities, we round down to zero when a probability is less than 0.1 and up to one when it is greater than 0.90.

2.5 Value and Growth Index Weights

Let M_i be the free-float market capitalization of stock i. Then the total Value market capitalization and Growth market capitalization within a particular size segment of the FT Wilshire 5000 Index is given by:

$$VMC = \sum_{i=1}^{N} P_{V,i} \times M_i \quad \text{and} \quad GMC = \sum_{i=1}^{N} P_{G,i} \times M_i \tag{7}$$

respectively, where N is the number of stocks in the size segment.

If $VMC > GMC$ we order the stocks by their value probabilities, smallest to largest. Moving up the list we then set:

$$P_{V,i} = 0.0 \qquad \text{and} \qquad P_{G,i} = 1.0 \tag{8}$$

recalculate VMC and GMC, and continue iteratively until we reach a stock for which $VMC < GMC$. For this and subsequent stocks we either partially allocate (so that $P_{V,i} \geq 0.1$) or completely allocate (with $P_{V,i} = 0.0$) until $VMC = GMC$. Otherwise, if initially $VMC < GMC$, the value and growth roles are reversed, and the process again achieves $VMC = GMC$.

We now define Value and Growth weights by:

$$W_{V,i} = \frac{P_{V,i} \times M_i}{VMC} \qquad \text{and} \qquad W_{G,i} = \frac{P_{G,i} \times M_i}{GMC} \tag{9}$$

respectively.

Note that, despite these modifications, $P_{V,i} + P_{G,i}$ still equals one, so we have the important property that:

$$W_{M,i} = \frac{1}{2}(W_{V,i} + W_{G,i}) = M_i / \sum_{j=1}^{N} M_j \tag{10}$$

In other words that the averaged of a stock's Value and Growth weights is equal to its weight in the underlying size segment of the FT Wilshire 5000 index.

3 Available Style Indexes

Table 1 sets out the various Style indexes in the series and the sets of targets and parameters that specify them:

Table 1: Available Style Indexes

Index Name	Underlying Index	Rebalance Schedule
FT Wilshire US Large Cap Value	FT Wilshire US Large Cap Index	March and September
FT Wilshire US Large Cap Growth	FT Wilshire US Large Cap Index	March and September
FT Wilshire US Small Cap Value	FT Wilshire US Small Cap Index	March and September
FT Wilshire US Small Cap Growth	FT Wilshire US Small Cap Index	March and September

4 Index Maintenance

4.1 Index Reconstitution

The FT Wilshire Style Index Series will be reconstituted semi-annually in March and September. The data cutoff date is Wednesday before the first Friday of the reconstitution month. Constituent and free-float changes are updated after the close of trading on the third Friday of the reconstitution month.

4.2 Intra-Reconstitution Additions

Additions to the underlying FT Wilshire index will be eligible for inclusion in the corresponding Style index immediately, with Value and Growth scores set to 0.5.

4.3 Intra-Reconstitution Deletions

A constituent will be removed from a FT Wilshire Style index if it is removed from the corresponding underlying FT Wilshire index. The deletion will be concurrent with that from the underlying index and its weight will be distributed pro-rata amongst the remaining constituents in the FT Wilshire Style index.

5 Corporate Events

5.1 Corporate Action Treatment

The Corporate action treatment for the FT Wilshire Style Index Series can be found in the Wilshire Indexes Equity Index Calculation and Corporate Action Guide. The Index Series will follow the non-market capitalization sections of the guide.

5.2 Suspension of Dealing

Suspension of Dealing rules can be found in the Wilshire Indexes Equity Index Calculation and Corporate Action Guide.

5.3 Takeovers, Mergers and Spinoffs

The treatment of takeovers, mergers and spinoffs can be found in the Wilshire Indexes Equity Index Calculation and Corporate Action Guide.

Approval

This Methodology was approved by the Wilshire OpCo UK Limited Index Management Committee.

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