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Section 1

Introduction

1.0 Introduction


1.2 The Russell US Factors Style Index Series is designed to reflect the performance of securities exhibiting particular style factor characteristics.

1.3 These Ground Rules should be read in conjunction with the Russell US Equity Indexes Construction and Methodology, The FTSE Global Factor Series Ground Rules and the Corporate Actions and Events Guide for Non Market Cap Weighted Indexes which are available at www.ftserussell.com. Unless stated in these Ground Rules, the Russell US Factors Style Indexes will follow the same process as the Russell US Equity Indexes Construction and Methodology.

1.4 Price Return and Total Return will be calculated on an end of day basis.

1.5 The base currency of the benchmark is US Dollars. Index values may also be published in other currencies.

1.6 The indexes may be calculated in real time.

1.7 FTSE Russell


1.8 FTSE Russell hereby notifies users of the index series that it is possible that circumstances, including external events beyond the control of FTSE Russell, may necessitate changes to, or the cessation of, the index series and therefore, any financial contracts or other financial instruments that reference the index series or investment funds which use the index series to measure their performance should be able to withstand, or otherwise address the possibility of changes to, or cessation of, the index series.

1.9 Index users who choose to follow this index series or to buy products that claim to follow this index series should assess the merits of the index rules-based methodology and take independent investment advice before investing their own or client funds. No liability whether as a result of negligence or otherwise is accepted by FTSE Russell (or any person concerned with the preparation
or publication of these Ground Rules) for any losses, damages, claims and expenses suffered by any person as a result of:

- any reliance on these Ground Rules, and/or
- any errors or inaccuracies in these Ground Rules, and/or
- any non-application or misapplication of the policies or procedures described in these Ground Rules, and/or
- any errors or inaccuracies in the compilation of the index series or any constituent data.
Section 2

Management Responsibilities

2.0 Management Responsibilities

2.1 FTSE International Limited (FTSE)

2.1.1 FTSE is the benchmark administrator of the index series.¹

2.1.2 FTSE is responsible for the daily calculation, production and operation of the index series and will:

- maintain records of the index weightings of all constituents;
- make changes to the constituents and their weightings in accordance with the Ground Rules;
- carry out periodic index reviews of the Index Series and apply the changes resulting from the reviews as required by the Ground Rules;
- publish changes to the constituent weightings resulting from their ongoing maintenance and the periodic reviews;
- disseminate the index series.

2.2 Amendments to These Ground Rules

2.2.1 These Ground Rules shall be subject to regular review by FTSE Russell to ensure that they continue to best reflect the aims of the index series. Any proposals for significant amendments to these Ground Rules will be subject to consultation with FTSE Russell advisory committees and other stakeholders if appropriate. The feedback from these consultations will be considered by the FTSE Russell Product Governance Board before approval is granted.

2.2.2 As provided for in the Statement of Principles for FTSE Russell Equity Indexes, where FTSE Russell determines that the Ground Rules are silent or do not specifically and unambiguously apply to the subject matter of any decision, any decision shall be based as far as practical on the Statement of Principles. After making any such determination, FTSE Russell shall advise the market of its decision at the earliest opportunity. Any such treatment will not be considered as an exception or change to the Ground Rules, or to set a precedent for future action, but FTSE Russell will consider whether the Ground Rules should subsequently be updated to provide greater clarity.

¹ The term administrator is used in this document in the same sense as it is defined in Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds (the European Benchmark Regulation).
Section 3

FTSE Russell Index Policies

3.0 FTSE Russell Index Policies

These Ground Rules should be read in conjunction with the following policy documents which can be accessed using the links below:

3.1 Corporate Actions and Events Guide

3.2 Full details of changes to constituent companies due to corporate actions and events can be accessed in the Corporate Actions and Events Guide for Non Market Cap Weighted Indexes using the following link:

Corporate_Actions_and_Events_Guide_for_Non_Market_Cap_Weighted_Indices.pdf

3.3 Statement of Principles for FTSE Russell Equity Indexes (the Statement of Principles)

Indexes need to keep abreast of changing markets and the Ground Rules cannot anticipate every eventuality. Where the Ground Rules do not fully cover a specific event or development, FTSE Russell will determine the appropriate treatment by reference to the Statement of Principles which summarises the ethos underlying FTSE Russell’s approach to index construction. The Statement of Principles is reviewed annually and any changes proposed by FTSE Russell are presented to the FTSE Russell Policy Advisory Board for discussion before approval by FTSE Russell’s Product Governance Board.

The Statement of Principles can be accessed using the following link:


3.4 Queries and Complaints

FTSE Russell’s complaints procedure can be accessed using the following link:

Benchmark_Determination_Complaints_Handling_Policy.pdf

3.5 Index Policy for Trading Halts and Market Closures

Guidance for the treatment of index changes in the event of trading halts or market closures can be found using the following link:

Index_Policy_for_Trading_Halts_and_Market_Closures.pdf

3.6 Index Policy in the Event Clients are Unable to Trade a Market

Details of FTSE Russell’s treatment can be accessed using the following link:

Index_Policy_in_the_EventClients_are_Unable_to_Trade_a_Market.pdf
3.7 **Recalculation Policy and Guidelines**

The Russell US Factors Style Index Series is recalculated whenever errors or distortions occur that are deemed to be significant. Users of the Russell US Factors Style Index Series are notified through appropriate media.

For further information refer to the FTSE Russell Recalculation Policy and Guidelines document which is available from the FTSE Russell website using the link below or by contacting info@ftserussell.com.

[Recalculation_Policy_and_Guidelines_Equity_Indexes.pdf](mailto:Recalculation_Policy_and_Guidelines_Equity_Indexes.pdf)

3.8 **Policy for Benchmark Methodology Changes**

Details of FTSE Russell's policy for making benchmark methodology changes can be accessed using the following link:

[Policy_for_Benchmark_Methodology_Changes.pdf](mailto:Policy_for_Benchmark_Methodology_Changes.pdf)
Section 4

Eligible Securities

4.0 Eligible Securities

4.1 The eligible securities of each index are the constituents of the relevant underlying Index:

<table>
<thead>
<tr>
<th>Factors Style Index Series</th>
<th>Underlying Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell US Large Cap Factors Value Style Index</td>
<td>Russell 1000 Value Index</td>
</tr>
<tr>
<td>Russell US Large Cap Factors Growth Style Index</td>
<td>Russell 1000 Growth Index</td>
</tr>
<tr>
<td>Russell US Large Cap Factors Blend Style Index</td>
<td>Russell 1000 Index</td>
</tr>
<tr>
<td>Russell US Mid Cap Factors Blend Style Index</td>
<td>Russell Mid Cap Index</td>
</tr>
<tr>
<td>Russell US Small Cap Factors Blend Style Index</td>
<td>Russell 2000 Index</td>
</tr>
</tbody>
</table>

4.2 For the Russell US Small Cap Factors Blend Style Index, the bottom 20% of stock counts ranked by liquidity from high to low in the Russell 2000 Index, based on the 60 trading days average of traded dollar volume, are excluded from the Index.
Section 5

Factor Construction

5.0 Factor Construction

The data cut-off date for the calculation of all factor data is the close of business on the last business day of the month prior to the review month.

5.1 Cross-Sectional Normalization

5.1.1 Individual stock metrics are normalized cross-sectionally to create Z-scores within each eligible universe according to:

\[ Z_{J,i} = \frac{(F_{J,i} - \mu_J)}{\sigma_J} \]

where \( F_{J,i} \) is the \( J^{th} \) metric of the \( i^{th} \) stock and \( \mu_J \) and \( \sigma_J \) are the cross-sectional mean and standard deviation, respectively. Z-Scores that are greater (less) than three (minus three) are truncated to a value of three (minus three).

5.2 Time Series Normalization

5.2.1 Individual stock time series Z-scores are normalized as:

\[ Z_{J,t} = \frac{(F_{J,t} - \mu_{J,t})}{\sigma_{J,t}} \]

where \( F_{J,t} \) is the \( J^{th} \) metric at time \( t \) and \( \mu_{J,t} \) and \( \sigma_{J,t} \) are the time series exponentially weighted moving average and standard deviation respectively, calculated following the procedures detailed in Rules 5.2.2 and 5.2.3.

5.2.2 The exponentially weighted moving average is calculated as:

\[
\mu_{J,t} = \frac{\sum_{\tau=t-W+1}^{t} F_{J,\tau} \left( \exp \left( \frac{\ln 0.5}{HL} \right) \right)^{t-\tau}}{\sum_{\tau=t-W+1}^{t} \left( \exp \left( \frac{\ln 0.5}{HL} \right) \right)^{t-\tau}}
\]

where \( F_{J,\tau} \) is the \( J^{th} \) metric at time \( \tau \), \( W \) is the time window length, and \( HL \) is the half-life of the decay.
5.2.3 The exponentially weighted moving standard deviation is calculated as:

\[
\sigma_{J,t} = \sqrt{\frac{\sum_{\tau=t}^{t+W} (F_{J,\tau} - \mu_{J,t-1})^2 \left( \exp \left( \frac{\ln 0.5}{HL} \right) \right)^{t-\tau}}{\sum_{\tau=t}^{t+W} \left( \exp \left( \frac{\ln 0.5}{HL} \right) \right)^{t-\tau}}}
\]

where \(F_{J,\tau}\) is the \(J^{th}\) signal value at time \(\tau\), \(W\) is the time window length, \(\mu_{J,t-1}\) is the time series exponentially weighted moving average of the \(J^{th}\) signal value at time \(t - 1\) calculated following the procedure detailed in Rule 5.2.2, and \(HL\) is the half-life of the decay.

5.3 Value

Value is defined as a composite of the following five metrics.

5.3.1 Book-to-Price is defined as:

\[
\frac{\text{Latest Book Value}}{\text{Full Market Capitalization}}
\]

5.3.2 Dividend Yield is defined as:

\[
\frac{\text{Latest 12 month Trailing Dividend}}{\text{Full Market Capitalization}}
\]

5.3.3 Earnings Yield is defined as:

\[
\frac{\text{Latest 12 month Net Income}}{\text{Full Market Capitalization}}
\]

5.3.4 Cash-flow Yield is defined as:

\[
\frac{\text{Latest 12 month Cashflow}}{\text{Full Market Capitalization}}
\]

Value metrics that are greater (less) than 0.35 (-0.35) are truncated to a value of 0.35 (-0.35).

5.3.5 Cash-flow Yield Time Series Normalized Signal

The Cash-flow yield signal is defined as the time-series normalized Cash-flow yield resulting from procedure detailed in Rule 5.2 with a half-life of 36 months with expanding window.

Cash-flow yield and Cash-flow-to-Price Time Series Signal are smoothed using an exponentially weighted moving average with expanding window and half-lives of 3 months and 1 month respectively.

5.3.6 Overall Value Score

Each of the five Value metrics is normalized cross-sectionally to form Z-scores capped at [-3, 3] (see Rule 5.1). The equal weighed average of the five Value metric Z-scores forms the overall Value score.

5.4 Momentum

Momentum is defined as a composite of the following three metrics.

5.4.1 Price Momentum is defined as:

\[
\sum_{t-11}^{t-1} \text{monthly price return}_t
\]

calculated over the twelve months prior to the data cut-off date, excluding the latest month. A full price history is required to calculate Price Momentum.
5.4.2 Earnings Momentum is defined as:

\[
\frac{(up_{fy1} + up_{fy2}) - (dn_{fy1} + dn_{fy2})}{tot_{fy1} + tot_{fy2}}
\]

Where:
- \(up_{fy1}\) is the number of EPS upgrades for the current fiscal year
- \(up_{fy2}\) is the number of EPS upgrades for the following fiscal year
- \(dn_{fy1}\) is the number of EPS downgrades for the current fiscal year
- \(dn_{fy1}\) is the number of EPS downgrades for the following fiscal year
- \(tot_{fy1}\) is the number of EPS estimates for the current fiscal year
- \(tot_{fy2}\) is the number of EPS estimates for the following fiscal year

Stocks with Earnings Momentum that is greater than one are treated as missing values in the calculation of the overall Momentum score.

5.4.3 Earnings Announcement Drift is calculated as:

\[r_t + r_{t+1}\]

where
- \(r_t\) is total return in USD on most recent earnings announcement date
- \(r_{t+1}\) is total return in USD on next business day after most recent earnings announcement date

With quarterly announcement date, the Earnings Announcement Drift incorporates a lag of 3 months. With semi-annual announcement date, the Earnings Announcement Drift does not incorporate a lag.

Values that are greater (less) than 0.15 (-0.15) are truncated to a value of 0.15 (-0.15).

5.4.4 Overall Momentum Score

Momentum metrics are first smoothed using an exponentially weighted average with expanding window and half-lives specified in the table below. All metrics are then normalized cross-sectionally to form Z-scores truncated at [-3, 3] (see Rule 5.1). The weighted average of the component Z-scores for each stock forms the overall Momentum score, using the weightings listed below. Weightings are re-normalized to reflect missing values for individual Momentum components.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Exponential Smoothing: Half-life</th>
<th>Weighting in Overall Momentum Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price Momentum</td>
<td>1 month</td>
<td>0.25</td>
</tr>
<tr>
<td>Earnings Momentum</td>
<td>6 months</td>
<td>0.50</td>
</tr>
<tr>
<td>Earnings Announcement Drift</td>
<td>6 months</td>
<td>0.25</td>
</tr>
</tbody>
</table>

5.5 Quality

Quality is defined as a composite of the following four metrics.
5.5.1 Accruals are calculated as:

\[
\frac{\Delta \text{Operating Assets} - \Delta \text{Total Liabilities}}{\text{Rolling 36 month average Total Assets}}
\]

where:

\(\Delta \text{Operating Assets}\) is monthly change in Total Assets minus Cash

\(\Delta \text{Total Liabilities}\) is monthly change in Total Liabilities

A full history is required to calculate latest 36 month average total assets. Values that are greater (less) than 0.2 (-0.12) are truncated to a value of 0.2 (-0.12).

5.5.2 Dilution is calculated as:

\[
- \frac{\text{shares}_t - \text{shares}_{t-1}}{\text{shares}_{t-1}}
\]

where shares are outstanding shares. Values that are greater (less) than 0.5 (-0.5) are truncated to a value of 0.5 (-0.5).

5.5.3 Gross Profitability is calculated as:

\[
\frac{\text{revenue} - \text{cost of goods sold}}{\text{total assets}}
\]

where revenue, cost of goods sold, and total assets are all greater than 0. Values that are greater (less) than 98% (2%) are truncated to 98% (2%). A cross-sectionally normalized Z-score is then created following the procedure detailed in Rule 5.1.

5.5.4 Change in Net Operating Assets (NOA) is calculated as:

\[
- \frac{\Delta \text{NOA}}{\text{Rolling 36 month average Total Assets}}
\]

where

\(\Delta \text{NOA} = \Delta \text{Operating Assets} - \Delta \text{Operating Liabilities}\)

where:

\(\Delta \text{Operating Assets}\) is monthly change in (Total Assets minus Cash)

\(\Delta \text{Operating Liabilities}\) is monthly change in (Total Liabilities minus Debt)

A full history is required to calculate latest 36 month average total assets. Values that are greater (less) than 0.1 (-0.05) are truncated to 0.1 (-0.05).

5.5.5 Overall Quality Score

Quality components with the exception of Gross Profitability are first smoothed using an exponentially weighted average with expanding window with half-lives specified in the table below. All Quality components are then converted to cross-sectionally normalized Z-scores truncated at [-3, 3] (see Rule 5.1). The weighted average of the component Z-scores for each stock forms the overall Quality Score using the weightings listed below. Weightings are re-normalized to reflect missing values for individual Quality components.
5.6 Low Volatility
Volatility is calculated as the standard deviation of monthly total return in USD, calculated over the twelve months prior to cut-off date. A complete twelve month history is required to calculate Volatility. Stock level volatilities are exponentially smoothed twice with expanding window and a half-life of 1 month and subsequently 2 months following the procedure detailed in Rule 5.2.3. Values are multiplied by -1 and are converted to percentage rank within eligible universe where percentage ranks that are greater (less) than 99.9 (0.1) percent are truncated to 99.9 (0.1) percent. The percentage ranks are then transformed using inverse of cumulative normal distribution. Values that are greater (less) than three (minus three) are then truncated to a value of three (minus three). The resulting value is the Low Volatility Score.

5.7 Size
Size is calculated as:

\[- \ln(\text{full market capitalization in USD})\]

Size is cross-sectionally normalized to form Z-scores following the procedure detailed in Rule 5.1.

5.8 Composite Factor Score
A composite factor score is calculated for each eligible stock as the weighted average of the overall factor scores with weightings shown in the table below. Missing overall factor scores are excluded from the aggregation, with weightings re-normalized to reflect the missing overall factor scores.

<table>
<thead>
<tr>
<th>Overall Scores</th>
<th>Weight for Growth Indexes</th>
<th>Weight for Value Indexes</th>
<th>Weight for Blend Indexes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Momentum Score</td>
<td>0.25</td>
<td>0.20</td>
<td>0.27</td>
</tr>
<tr>
<td>Value Score</td>
<td>0.20</td>
<td>0.25</td>
<td>0.27</td>
</tr>
<tr>
<td>Quality Score</td>
<td>0.45</td>
<td>0.45</td>
<td>0.36</td>
</tr>
<tr>
<td>Low Volatility Score</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>Size Score</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
</tr>
</tbody>
</table>

The composite factor score is smoothed using a time series exponentially weighted moving average of the composite factor scores with an expanding window and a half-life of 12 months following the procedure detailed in Rule 5.2.2.
Section 6

Risk Model

6.0 Risk Model

6.1 The data cut-off date is the close of business on the last business day of the month prior to the review month.

6.2 Exponential weights are used in the regression and in calculating the factor covariance matrix:

\[ w = \exp \left( \frac{\ln 0.5}{H_L} \right)^t \]

where \( H_L \) is the half-life of the decay and \( t \) is the age of the observation.

6.3 The risk model is a time series structural risk model based on Kimura (April 2019).

6.4 The ranking universe is the Russell 1000® Index for the Russell 1000 risk model, and the Russell 2000® Index for the Russell 2000 risk model, as of the review effective date.

6.5 Factor Covariance Matrix

6.5.1 Factor returns are estimated using the following monthly index monthly returns:

<table>
<thead>
<tr>
<th>Index Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell 1000 Risk Model</td>
</tr>
<tr>
<td>Russell 2000 Risk Model</td>
</tr>
<tr>
<td>Style Factors</td>
</tr>
<tr>
<td>Russell 1000 Momentum Factor Index</td>
</tr>
<tr>
<td>Russell 2000 Momentum Factor Index</td>
</tr>
<tr>
<td>Russell 1000 Quality Factor Index</td>
</tr>
<tr>
<td>Russell 2000 Quality Factor Index</td>
</tr>
<tr>
<td>Russell 1000 Size Factor Index</td>
</tr>
<tr>
<td>Russell 2000 Size Factor Index</td>
</tr>
<tr>
<td>Russell 1000 Value Index</td>
</tr>
<tr>
<td>Russell 2000 Value Index</td>
</tr>
<tr>
<td>Russell 1000 Volatility Factor Index</td>
</tr>
<tr>
<td>Russell 2000 Volatility Factor Index</td>
</tr>
<tr>
<td>Russell 1000 Yield Factor Index</td>
</tr>
<tr>
<td>Russell 2000 Yield Factor Index</td>
</tr>
<tr>
<td>Russell 1000 Growth Index</td>
</tr>
<tr>
<td>Russell 2000 Growth Index</td>
</tr>
</tbody>
</table>
### Industry Factors

<table>
<thead>
<tr>
<th>Russell 1000 Energy Index</th>
<th>Russell 2000 Energy Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell 1000 Basic Materials Index</td>
<td>Russell 2000 Basic Materials Index</td>
</tr>
<tr>
<td>Russell 1000 Industrials Index</td>
<td>Russell 2000 Industrials Index</td>
</tr>
<tr>
<td>Russell 1000 Consumer Staples Index</td>
<td>Russell 2000 Consumer Staples Index</td>
</tr>
<tr>
<td>Russell 1000 Health Care Index</td>
<td>Russell 2000 Health Care Index</td>
</tr>
<tr>
<td>Russell 1000 Consumer Discretionary Index</td>
<td>Russell 2000 Consumer Discretionary Index</td>
</tr>
<tr>
<td>Russell 1000 Telecommunications Index</td>
<td>Russell 2000 Telecommunications Index</td>
</tr>
<tr>
<td>Russell 1000 Utilities Index</td>
<td>Russell 2000 Utilities Index</td>
</tr>
<tr>
<td>Russell 1000 Financials Index</td>
<td>Russell 2000 Financials Index</td>
</tr>
<tr>
<td>Russell 1000 Real Estate Index</td>
<td>Russell 2000 Real Estate Index</td>
</tr>
<tr>
<td>Russell 1000 Technology Index</td>
<td>Russell 2000 Technology Index</td>
</tr>
</tbody>
</table>

6.5.2 The Market factor is represented by the market index returns.

6.5.3 Residual style factor returns are calculated using the following time series regression:

\[ i_s = \beta_{s,\text{market}} f_{\text{market}} + f_s \]

where \( i_s \) is style factor \( s \), \( f_{\text{market}} \) is the market factor, and the residual return \( f_s \) is the factor return to style factor \( s \).

The inputs to regression are smoothed using exponential decay weights following the procedure detailed in Rule 6.2 with a half-life of 36 months. The regression window is 60 months.

6.5.4 Residual industry factor returns are calculated using the following time series regression:

\[ i_{\text{ind}} = \beta_{\text{ind,market}} f_{\text{market}} + \sum_{s=1}^{7} \beta_{\text{ind},s} i_s + f_{\text{ind}} \]

where \( i_{\text{ind}} \) is industry factor \( \text{ind} \), \( f_{\text{market}} \) the market factor, \( i_s \) the style index returns for style factor \( s \), and \( f_{\text{ind}} \) is the residual industry factor returns for industry \( \text{ind} \).

The inputs to the regression are smoothed using exponential decay weights following the procedure detailed in Rule 6.2 with a half-life of 36 months. The regression window is 60 months.

6.5.5 The factor covariance matrix is calculated using the residual style and industry factor returns.

6.6 **Stock Beta**

6.6.1 Raw Stock Beta

The raw stock betas are calculated using:

\[ r_j = a_j + \beta_{j,\text{market}} f_{\text{market}} + \sum_{s=1}^{7} \beta_{j,s} f_s + \beta_{j,\text{ind}} f_{\text{ind}} + u_j \]

where \( r_j \) is the stock \( j \)'s time series of monthly total returns, \( f \) are the market, residual style, and residual industry factor returns from Rule 6.5.
The inputs to regression are smoothed using exponential decay weights following the procedure detailed in Rule 6.2 with a half-life of 36 months. The regression window is 60 months.

6.6.2 Capped Stock Beta
Values more than five standard deviation from the mean are capped at five standard deviation from the mean.

6.6.3 Country Beta
Country beta is calculated as the simple cross-sectional average of capped beta.

6.6.4 Industry Beta
Industry beta is calculated as the cross-sectional average of the capped betas within each industry.

6.6.5 Historical Beta
Historical beta is calculated as the time series average of monthly capped betas up to the previous month with expanding window:

\[ \bar{\beta}_{j,t} = \frac{1}{t-1} \sum_{s=1}^{t-1} \beta_{j,s} \]

6.6.6 Prior Beta
Prior beta is calculated as the weighted average of country, industry, and historical betas:

\[ \tilde{\beta}_{j,t} = w_{\text{country}} \beta_{\text{country},t} + w_{\text{industry}} \beta_{\text{industry},t} + w_{\text{historical}} \bar{\beta}_{j,t} \]

where \( w_{\text{country}} = 0.25, w_{\text{industry}} = 0.25, \) and \( w_{\text{historical}} = 0.5. \)

Where the historical beta is missing, it is excluded from the calculation and the weights are re-normalized.

6.6.7 Stock Beta
Stock beta is calculated as the average of capped beta and prior beta:

\[ \beta_{j,t}^* = \rho \tilde{\beta}_{j,t} + (1 - \rho) \bar{\beta}_{j,t} \]

where \( \rho = 0.7. \)

Where a capped beta is missing, the stock beta is set to the prior beta.

6.7 Stock Specific Risk

6.7.1 Stock Residuals
Stock residual \( u_j \) is calculated as:

\[ r_j = \beta_{j,\text{market}} f_{\text{market}} + \sum_{k=1}^{7} \beta_{j,k}^* f_k + \beta_{j,\text{industry}} f_{\text{industry}} + u_j \]

6.7.2 Average Absolute Specific Returns
Cross sectional average absolute specific returns are calculated as:

\[ S_t = \sum_j \sqrt{w_{j,t-1}} |u_{j,t}| \]

where \( w_{j,t-1} \) is the market cap weight of stock \( j \) at beginning of month \( t, \) \( |u_{j,t}| \) is the absolute stock residuals (6.7.1). \( S_t \) is subsequently calculated as the time series exponentially weighted moving
average of \( S_t \) with a half-life of 4 months and 8 months window up to previous month following procedure detailed in Rule 5.2.2.

A missing market capitalisation of a stock at the beginning of the month is replaced with market capitalisation at the end of the month discounted by the corresponding industry factor return.

6.7.3 Relative to Market Specific Returns

A. Relative to market specific returns are calculated as:

\[
V_{jt} = \frac{|u_{jt}|}{S_t} - 1
\]

for stock \( j \) at time \( t \).

B. Definition of factors to estimate relative to market specific returns

i. Time series averages of relative market specific returns are calculated as \( v_{t6j,t}, v_{t12j,t}, v_{t60j,t} \) using 6, 12, and 60 months of data respectively.

6,12, 60 month time series averages of relative to market specific returns are calculated as:

\[
\bar{v}_{j,t} = \frac{\sum_{t=1-N}^{t-1} V_{j,t}}{n_{j,t}}
\]

where \( n_{j,t} \) is number of non-missing \( V_{j,t} \) and is required to be \( \geq 4, 8, 40 \) respectively.

A cross-sectionally equal weighted industry average is calculated as \( i\bar{v}_{j,t} \).

A refined 6,12, 60 month time series averages of relative to market specific returns are calculated as:

\[
v_{tj,t} = \frac{\sum_{t=t-N}^{t-1} V_{j,t} + (N - n_{j,t})i\bar{v}_{j,t}}{N}
\]

where \( n_{j,t} \) is number of non-missing \( V_{j,t} \) and \( N = 6,12, 60 \) respectively.

Cross-sectionally normalized score of the refined \( v_{tj,t} \) is calculated following the procedure detailed in 5.1.1 as \( v_{t6j,t}, v_{t12j,t}, v_{t60j,t} \).

ii. High and Low Size Scores

A cross-sectionally normalized score of market weights is calculated following the procedure detailed in Rule 5.1.1.

lo and hi size scores are calculated as:

\[
lo = \begin{cases} 
\text{size\_score}, & \text{size\_score} < 0 \\
0, & \text{size\_score} \geq 0 
\end{cases}
\]

\[
hi = \begin{cases} 
0, & \text{size\_score} < 0 \\
\text{size\_score}, & \text{size\_score} \geq 0 
\end{cases}
\]

iii. Return Volatility

Return volatility is calculated as 18 months volatility using total monthly returns. A minimum of 12 months is required to calculate return volatility. Cross-sectionally normalized score is calculated following the procedure detailed in Rule 5.1.

iv. Dividend Yield Dummy Variable

Dividend yield dummy variable is calculated as:

\[
dmyl = \begin{cases} 
0, & \text{Dividend yield is missing} \\
0, & \text{Dividend yield} \geq 0.5\% \\
1, & \text{Dividend yield} < 0.5\%
\end{cases}
\]

where dividend yield is defined in Rule 5.3.2.
v. **Price Momentum**

Price momentum is defined in Rule 5.4.1.

A cross-sectionally normalized score is calculated following the procedure detailed in Rule 5.1.

vi. **Industry Membership**

A dummy variable indicating the industry the stock belongs to.

### C. Estimate cross-sectional specific risk parameter estimates

$V_{jt}$ is capped at 3 standard deviation from the cross sectional mean as $V_{jt}^{trim}$.

A pooled regression incorporating the latest 60 months (t-1 to t-60) of observations is used to estimate betas:

$$ V_{jt}^{trim} = \beta_{vt6,j}v_{t6,j,t-1t060} + \beta_{vt12,j}v_{t12,j,t-1t060} + \beta_{vt60,j}v_{t60,j,t-1t060} + \beta_{lo,j}l_{o,j,t-1t060} + \beta_{hi,j}h_{i,j,t-1t060} + \beta_{retvol,j}r_{etvol,j,t-1t060} + \beta_{dmyl,j}d_{myl,j,t-1t060} + \beta_{pmom,j}p_{mom,j,t-1t060} + \sum_{ind} \beta_{ind,j}ind_{j,t-1t060} $$

where $retvol$ is the Return Volatility, $pmom$ is the Price Momentum and $ind$ is the Industry Membership.

The betas are then used to forecast $V_{jt}$:

$$ V_{jt} = \beta_{vt6,j}v_{t6,j,t} + \beta_{vt12,j}v_{t12,j,t} + \beta_{vt60,j}v_{t60,j,t} + \beta_{lo,j}l_{o,j,t} + \beta_{hi,j}h_{i,j,t} + \beta_{retvol,j}r_{etvol,j,t} + \beta_{dmyl,j}d_{myl,j,t} + \beta_{pmom,j}p_{mom,j,t} + \sum_{ind} \beta_{ind,j}ind_{j,t} $$

Missing return volatility and price momentum are replaced with industry averages to estimate $V_{jt}$.

#### 6.7.4 Kappa

Size decile is defined cross-sectionally by market weight.

For each decile $k$, average cross-sectional absolute specific returns are calculated as:

$$ S_{k,t} = \frac{\sum_{i} |w_{i,t-1}u_{i,t}|}{\sum_{i} w_{i,t-1}} $$

where $w_{i,t}$ is the free float adjusted market capitalization weight at beginning of month $t$.

For each decile $k$, average cross-sectional squared specific returns are calculated as:

$$ SQ_{k,t} = \frac{\sum_{i} w_{i,t-1}u_{i,t}^2}{\sum_{i} w_{i,t-1}} $$

where $w_{i,t}$ is the free float adjusted market capitalization weight at beginning of month $t$.

Kappa is calculated as:

$$ K_{k,t} = \frac{1}{60} \frac{S_{k,t}}{\sqrt{SQ_{k,t}}} $$

A missing market capitalization of a stock at the beginning of the month is replaced with the market capitalisation at the end of the month discounted by the corresponding industry factor return.

#### 6.7.5 Stock specific risk is calculated as:

$$ \delta_{j,t} = (1 + V_{j,t})S_{t}K_{k,t} $$
Section 7
Index Construction

7.0 Index Construction

7.1 Risk Model
A corresponding risk model is used according to the following table:

<table>
<thead>
<tr>
<th>Factors Style Index Series</th>
<th>Risk Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell US Large Cap Factors Value Style Index</td>
<td>Russell 1000</td>
</tr>
<tr>
<td>Russell US Large Cap Factors Growth Style Index</td>
<td>Russell 1000</td>
</tr>
<tr>
<td>Russell US Large Cap Factors Blend Style Index</td>
<td>Russell 1000</td>
</tr>
<tr>
<td>Russell US Mid Cap Factors Blend Style Index</td>
<td>Russell 1000</td>
</tr>
<tr>
<td>Russell US Small Cap Factors Blend Style Index</td>
<td>Russell 2000</td>
</tr>
</tbody>
</table>

7.2 Optimization

7.2.1 Index stock weights are calculated using optimization below:

$$\max_w w' \alpha$$

s.t.

- $\Delta w_k \in [-0.02, +0.02]$, $\forall k$ in ICB industry (industry weight constraint)
- $\beta \in [0.98, 1.02]$ (beta constraint)
- $\Delta w' \Omega \Delta w \leq \frac{0.02^2}{12}$ for growth and value indexes and $\Delta w' \Omega \Delta w \leq \frac{0.015^2}{12}$ for blend indexes (tracking error constraint)
- $\Delta w_i \in [-w_{mkt,i}, 0.02]$, $\forall i$ (stock weight constraint)
- $\sum_i \Delta w_i = 0$ (leverage constraint)
- $\Delta w' f_q \geq 0.2$ (active quality exposure constraint)
- $\Delta w' f_v \geq 0$ for growth and blend indexes and $\Delta w' f_v \geq 0.2$ for value index (active value exposure constraint)
- $\Delta w' f_m \geq 0$ for value index and $\Delta w' f_m \geq 0.2$ for growth and blend indexes (active momentum exposure constraint)
• \( w \geq 0.5 \text{bps} \) (minimum stock weight constraint)

where

• \( w \) is the index stock weight
• \( F \) is factor covariance matrix from Rule 6.5.5

\[
\hat{\beta} = w' \left[ \frac{\beta F \hat{\beta} + w^2}{\hat{\beta}_mkt \beta \hat{\beta}_mkt + (w_{mkt})^2} \right]
\]

• \( \beta \) is the vector of stock beta from Rule 6.6.7
• \( \sigma \) is the vector of stock residual risk from Rule 6.7.5

Missing stock residual risk is set to 0 and stocks with missing residual risk are not included in the factors style index.

• \( \circ \) is the matrix elementwise product

\[
\alpha = 0.05 \times \text{score} \circ \sqrt{\text{diag}(\beta F \beta) + \sigma^2}
\]

where \( \text{score} \) is composite factor score from Rule 5.8. Missing \( \text{score} \) is set to 0 and stocks with missing \( \text{score} \) are not included in the factors style index.

• \( w_{mkt} \) is the market index stock weight
• \( \beta_{mkt} = w_{mkt} \beta \)
• \( \Delta w = w - w_{mkt} \)
• \( \Omega = \beta F \beta' + \text{diag}(\sigma^2) \)

\( f_q \) is quality score, \( f_v \) is value score, \( f_m \) is momentum score from Rules 5.5.5, 5.3.6, 5.4.4.

7.3 **Index Back-Histories**

The availability of data prior to the launch date of each index is simulated through the application of a lag on fundamental data. All index reviews prior to the launch date that utilize realized fundamental data incorporate a lag. Components of the Value factor detailed in Rule 5.3 incorporate annual Cash-flow, Net Income and Book measures that were announced 3 months prior to the data cut-off date. Components of the Quality factor detailed in Rule 5.5 incorporate Revenue, Cost of Goods Sold, Total Assets, Cash, Liabilities, and Debt measures that were announced 2 months prior to the data cut-off date, and Shares that was 1 month prior to the data cut-off date. Component of the Momentum factor detailed in Rule 5.4 incorporates earnings announcement drift that was 1 month prior to the data cut-off date.
Section 8

Periodic Review of Constituents

8.0 Periodic Review of Constituents

8.1 Review and Price Dates

8.1.1 The Russell US Factors Style Index Series will be reviewed monthly based on the stock prices available at close of business on the last business day of the month prior to the review month.

8.1.2 The review will be implemented after the close of the 6th business day of the month.

8.1.3 Changes arising from review are announced after the close of the 4th business day of the month.
Section 9

Changes to Constituent Companies

9.0 Changes to Constituent Companies

9.1 Intra-review Additions

Additions to the parent index will be considered for inclusion in the Russell US Factors Style Index Series at the next review.

9.2 Intra-review Deletions

A constituent will be removed from the Russell US Factors Style Index Series if it is also removed from the corresponding parent index. The deletion will be effective concurrent with the removal from the parent index provided a minimum of two days notice can be provided. Otherwise, the deletion will be effective with two days notice and its weight will be distributed pro-rata amongst the remaining constituents.
Section 10

Corporate Actions and Events

10.0 Corporate Actions and Events

10.1 If a constituent in the underlying index has a stock split, stock consolidation, rights issue, bonus issue, a change in the number of shares in issue or a change in free float, the constituent’s weighting in the Russell US Factors Style Index Series will remain unchanged pre and post such an event.

10.2 Full details of changes to constituent companies due to corporate actions and events can be accessed in the Corporate Actions and Events Guide for Non Market Cap Weighted Indexes using the following link:

Corporate_Actions_and_Events_Guide_for_Non_Market_Cap_Weighted_Indices.pdf

A Corporate ‘Action’ is an action on shareholders with a prescribed ex date. The share price will be subject to an adjustment on the ex date. The index will be adjusted in line with the ex date.

These include the following:

- Capital Repayments
- Rights Issues/Entitlement Offers
- Stock Conversion
- Splits (sub-division) / Reverse splits (consolidation)
- Scrip issues (Capitalization or Bonus Issue)

A Corporate ‘Event’ is a reaction to company news (event) that may impact the index depending on the index rules. For example, a company announces a strategic shareholder is offering to sell their shares (secondary share offer) – this could result in a free float weighting change in the index. Where an index adjustment is required FTSE will provide notice advising of the timing of the change.

10.3 Suspension of Dealing

Suspension of Dealing rules can be found within the Corporate Actions and Events Guide for Non Market Cap Weighted Indexes.

10.4 Takeovers, Mergers and Demergers

The treatment of takeovers, mergers and demergers can be found within the Corporate Actions and Events Guide for Non Market Cap Weighted Indexes.
Section 11

Indexes Algorithm and Calculation Method

11.0 Indexes Algorithm and Calculation Method

11.1 Prices
The Russell US Factors Style Index Series uses actual closing mid-market or last trade prices, where available, for securities with local market quotations. Further details can be accessed using the following link:
Closing_Prices_Used_For_Index_Calculation.pdf

11.2 Calculation Frequency
The Russell US Factors Style Index Series will be calculated on an end of day basis and displayed to eight decimal points.

11.3 Index Calculation
The Russell US Factors Style Index Series is calculated using the algorithm described below:

\[ \sum_{i=1}^{N} \left( p_i \times e_i \times s_i \times f_i \times c_i \right) \]

Where,

- \( i=1,2,\ldots,N \)
- \( N \) is the number of securities in the Index.
- \( p_i \) is the latest trade price of the component security (or the price at the close of the index on the previous day).
- \( e_i \) is the exchange rate required to convert the security’s currency into the index’s base currency.
- \( s_i \) is the number of shares in issue used by FTSE Russell for the security, as defined in these Ground Rules.
- \( f_i \) is the Investability Weighting Factor to be applied to a security to allow amendments to its weighting, expressed as a number between 0 and 1, where 1 represents a 100% free float. This factor is published by FTSE Russell for each security in the underlying index.
- \( c_i \) is the Weight Adjustment Factor to be applied to a security to correctly weight that security in the index. This factor maps the investable market capitalization of each stock to a notional market capitalization for inclusion in the index.
• $d$ is the divisor, a figure that represents the total issued share capital of the Index at the base date. The divisor can be adjusted to allow changes in the issued share capital of individual securities to be made without distorting the index.
Appendix A: Further Information

A Glossary of Terms used in FTSE Russell’s Ground Rule documents can be found using the following link: [Glossary.pdf](Glossary.pdf)

Further information on the Russell US Factors Style Index Series is available from FTSE Russell.

For contact details please visit the FTSE Russell website or contact FTSE Russell client services at [info@ftserussell.com](mailto:info@ftserussell.com).

Website: [www.ftserussell.com](http://www.ftserussell.com)