FTSE Russell Market Consultation

FTSE Russell Diversification Factor

October 2026

FTSE RUSSELL
An LSEG Business

FTSE Russell Style Methodology	Use of Effective N and K
Complementary document to market consultation	Formula and Example

Introduction

The Russell US Style Indexes classify constituents along the value-growth spectrum using book-to-price, forecast growth and historical sales growth. These measures are combined into a Composite Value Score and transformed into value and growth probabilities. Under the standard methodology, market-capitalization-weighted distributions determine the factor and Composite Value Score breakpoints.

Periods of atypical market concentration can allow a small number of very large companies to exert disproportionate influence over those breakpoints. This may compress one style into a relatively small group of constituents, reducing diversification and making the resulting style allocation less representative of the broader opportunity set.

When effective N, the measure of how many “equally weighted” observations would produce the same level of concentration as the actual distribution, is <100 the market capitalization weights are reduced exponentially by k. The exponent **k** is calibrated so that the Effective N is brought back to 100. using the least adjustment necessary. The resulting transformed market weights are used in the non-linear style calculation. A value of k=1 leaves the standard methodology unchanged, while values below one progressively reduces the influence of the largest constituents.

As an additional safeguard in the consultation methodology, Growth (Value) is limited to a 10% band beyond 50/50 of the resulting market-value allocation, ensuring that Value (Growth) retains at least 40%. The 10% band balances diversification, representativeness and minimal intervention.

Concentration Level: Effective N Formula

Effective N is calculated with the following formula:

$$Effective\ N = \frac{1}{\sum_{i=1}^{N} w_i^2}$$

Where w_i is each constituent is, weight expressed as a decimal and weights sum to 1

The interpretation is straightforward:

– Higher Effective N = less concentrated / more diversified

– Lower Effective N = more concentrated

– Effective N can never exceed the actual number of constituents under this definition

– If every constituent has the same weight, equally weighted, Effective N will equal the actual number of constituents

Once it is determined if the index Effective N is less than 100, FTSE Russell Diversification Factor utilizes the following algorithm.

FTSE Russell Diversification Factor

A. The algorithm applies a non-linear transformation to index weights, maintaining market representation subject to triggers and constraints. The weight transformation formula is defined as:

$$w_{t,i} = \frac{\left(w_{m,i}\right)^k}{\sum_{j=1}^{N}\left(w_{m,j}\right)^k}$$

Where:

– $w_{t,i}$ is the weight of constituent used in style calculation

– $w_{m,i}$ is the market weight of constituent in the underlying index

– k is the parameter to control the degree of deviation from the original weight

– N is the number of constituents in the underlying index

C. Intuition of the parameter k:

– When $k = 1$, the target weight is identical to the weight in the underlying index

– When $k = 0$, each constituent receives an equal weight

– When $k < 1$, the weights become more diversified

– When $k > 1$, the weights become more concentrated

D. The FTSE Russell Diversification Factor is only triggered when the Effective N is < 100.

$$k$$

Application of FTSE Russell Diversification Factor

The FTSE Russell Diversification Factor detects periods of excessive market concentration by assessing the Effective N of the underlying core index. When Effective N is less than 100, the overlay is triggered. It then incrementally and proportionately reduces the influence of market-cap concentration until the Effective N is 100, while maintaining the overall market-value allocation within the established 60/40 band.

Exhibit 1: Shift of probabilities given concentration in Russell 1000.

The FTSE Russell Diversification Factor is designed to shift the probability of individual stocks toward the style where lower concentration exists to reset the equilibrium when large concentration is in the complementary style.

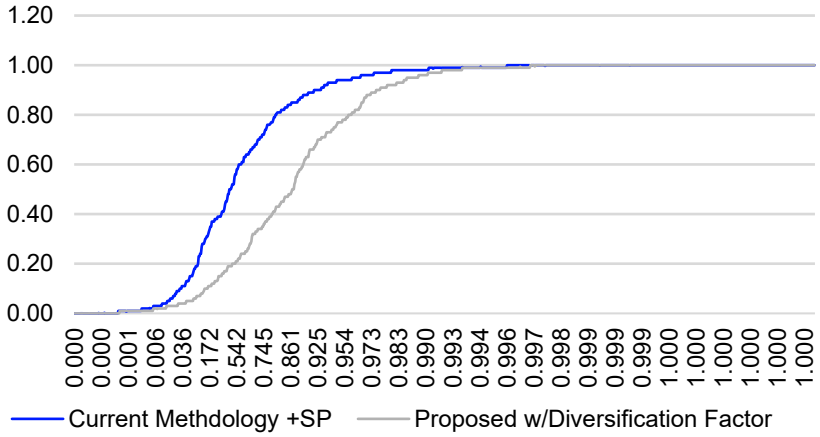
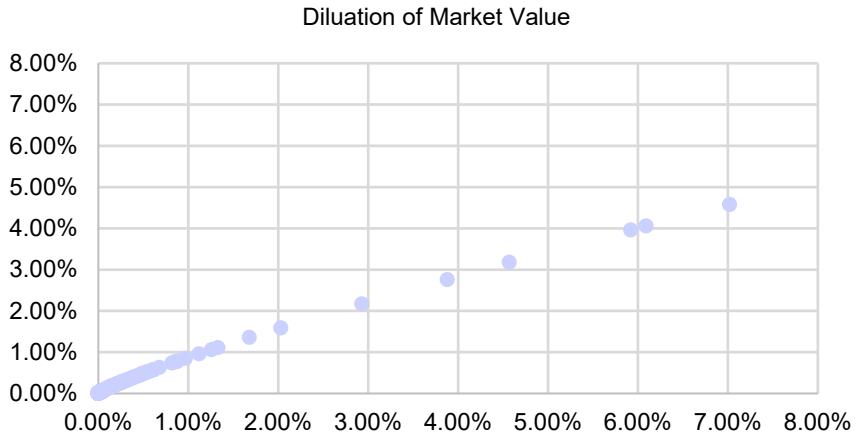


Exhibit 2: Adjusted market-value Influence

If concentration is identified by analyzing the concentration (through Effective N) each market value is adjusted proportionally until the concentration is reduced enough to result in at least an Effective N of 100, or until no more than 60% of one style is achieved by market value.



Example of FTSE Russell Diversification Factor

The example below assumes a 20-stock index and provides a step-by-step example of how the proposed overlay to the existing methodology is applied.

Step 1 – Calculate the Effective N of the underlying index.

Of the 20-stock example, below, Effective N = 1.83, which represents the diversification of the same as an index of an equality weighted portfolio of less than 2 stocks. In this example, the goal is a concentration level of 2 or 10% of the number of stocks.

	Market Value	Weight	Weight^2
Company A	$951,353,760,600,000	65.314%	0.43
Company B	$505,208,730,000,000	34.684%	0.12
Company C	$26,091,744,800	0.002%	0.00
Company D	$849,470,320	0.000%	0.00
Company E	$644,781,370	0.000%	0.00
Company F	$52,963,172	0.000%	0.00
Company G	$30,723,376	0.000%	0.00
Company H	$28,481,455	0.000%	0.00
Company I	$21,121,779	0.000%	0.00
Company J	$6,251,171	0.000%	0.00
Company K	$3,251,171	0.000%	0.00
Company L	$2,251,171	0.000%	0.00
Company M	$2,251,171	0.000%	0.00
Company N	$2,251,171	0.000%	0.00
Company O	$2,251,171	0.000%	0.00
Company P	$2,251,171	0.000%	0.00
Company Q	$2,251,171	0.000%	0.00
Company R	$2,251,171	0.000%	0.00
Company S	$2,251,171	0.000%	0.00
Company K	$2,251,171	0.000%	0.00
Total / Effective N	$1,456,590,239,649,150		1.83

Step 2 – Reduce the Market Value by an exponent of K until the concentration level is 2 or greater...

After applying the overlay in and iterative process (k =0.44), the resulting Effective N at 2.0025 (>2) achieving the desired concentration level. The adjusted market value is used in the standard FTSE Russell style algorithm.

Company	Market Value ($mil)	Reduced MV (MV^K)	Adjusted Weight	Weight^2
Company A	$951,353,760,600,000	$3,894,668.49	56.34%	0.32
Company B	$505,208,730,000,000	$2,947,997.92	42.65%	0.18
Company C	$26,091,744,800	$38,305.52	0.55%	0.00
Company D	$849,470,320	$8,488.39	0.12%	0.00
Company E	$644,781,370	$7,518.68	0.11%	0.00
Company F	$52,963,172	$2,503.51	0.04%	0.00
Company G	$30,723,376	$1,970.09	0.03%	0.00
Company H	$28,481,455	$1,905.49	0.03%	0.00
Company I	$21,121,779	$1,670.63	0.02%	0.00
Company J	$6,251,171	$977.74	0.01%	0.00
Company K	$3,251,171	$733.33	0.01%	0.00
Company L	$2,251,171	$623.82	0.01%	0.00
Company M	$2,251,171	$623.82	0.01%	0.00
Company N	$2,251,171	$623.82	0.01%	0.00
Company O	$2,251,171	$623.82	0.01%	0.00
Company P	$2,251,171	$623.82	0.01%	0.00
Company Q	$2,251,171	$623.82	0.01%	0.00
Company R	$2,251,171	$623.82	0.01%	0.00
Company S	$2,251,171	$623.82	0.01%	0.00
Company K	$2,251,171	$623.82	0.01%	0.00
		$6,912,354		**2.0025**

Step 3: Apply banding of 10% around the initial 50/50 requirement.

If after the style algorithm is run, and the style of growth or value exceeds 60%, k is reassessed until the adjusted weights result in less than 60% of any one style. Historically, this threshold has not been reached.

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