



FTSE Global Minimum Variance Index Series

v3.3



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Section 1

Introduction

1.0 Introduction

- 1.1 This document sets out the Ground Rules for the construction and management of the FTSE Global Minimum Variance Index Series calculated by FTSE International Limited (FTSE). Copies of these Ground Rules are available from FTSE.
- 1.2 The FTSE Global Minimum Variance Index Series have been designed to create a series of indexes that minimise index volatility, based on historical return information, thereby offering potential improvements to the risk/reward trade-off of the index.
- 1.3 These Ground Rules should be read in conjunction with the underlying index Ground Rules which are available at www.ftserussell.com.
- 1.4 The FTSE Global Minimum Variance Index Series consists of the following indexes:
 - FTSE Developed Minimum Variance Index
 - FTSE Developed Europe Minimum Variance Index
 - FTSE Developed Europe ex UK Minimum Variance Index
 - FTSE Developed Eurozone Minimum Variance Index
 - FTSE Developed ex Japan Minimum Variance Index
 - FTSE Developed ex USA Minimum Variance Index
 - FTSE Developed Asia Pacific Minimum Variance Index
 - FTSE Developed Asia Pacific ex Japan Minimum Variance Index
 - FTSE Developed Asia Pacific ex Japan ex Korea Minimum Variance Index
 - FTSE Developed Asia Pacific ex Korea Minimum Variance Index
 - FTSE Developed World ex Korea ex Israel Minimum Variance Index
 - FTSE Developed ex Selected Countries Minimum Variance Index
 - FTSE All-World Minimum Variance Index
 - FTSE North America Minimum Variance Index
 - FTSE Emerging Minimum Variance Index
 - FTSE Developed Shariah Minimum Variance Index
 - FTSE4Good Developed Minimum Variance Index
 - FTSE ASFA Australia 300 Minimum Variance Index
 - FTSE Japan Minimum Variance Index
 - FTSE Korea Minimum Variance Index
 - FTSE Thailand Mid/Small Cap Minimum Variance Index

FTSE UK Minimum Variance Index
FTSE USA Minimum Variance Index
FTSE China A Free Minimum Variance Index
Russell 1000 Minimum Variance Index
Russell 2000 Minimum Variance Index

1.5 Price and Total Return Indexes will be calculated on an end of day and real time basis. The Total Return Indexes include income based on ex dividend adjustments.

1.6 Index values are calculated in US Dollars and may also be published in other currencies.

1.7 **FTSE Russell**

FTSE Russell is a trading name of FTSE International Limited, Frank Russell Company, and FTSE Global Debt Capital Markets Limited and its subsidiaries (including MTSNext Limited). FTSE International Limited is the administrator of all FTSE Russell indexes.

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 or to buy products that claim to follow this index should assess the merits of the index's 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 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 and reserve companies;
- make changes to the constituents and their weightings in accordance with the Ground Rules;
- carry out the 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 indexes.

2.1.3 FTSE is also be responsible for monitoring the performance of the FTSE Global Minimum Variance Index Series throughout the day and will determine whether the status of each index should be Firm, Indicative or Held (see Appendix B).

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, 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 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:

[Statement of Principles.pdf](#)

3.4 Queries, Complaints and Appeals

A constituent or prospective constituent company (or professional advisor acting on behalf of the company), a national organisation or a group of no fewer than ten users of the Indexes from different organisations acting in their professional capacity may appeal against decisions taken by FTSE Russell.

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

[Benchmark Determination Complaints Handling Policy.pdf](#)

FTSE Russell's Appeal Process can be accessed using the following link:

[Appeals Against Decisions.pdf](#)

3.5 **Index Policy for Trading Halts and Market Closures**

- 3.5.1 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**

- 3.6.1 Details of FTSE Russell's treatment can be accessed using the following link:

[Index Policy in the Event Clients are Unable to Trade a Market.pdf](#)

3.7 **Recalculation Policy and Guidelines**

- 3.7.1 The FTSE Global Minimum Variance Index Series are recalculated whenever errors or distortions occur that are deemed to be significant. Users of the FTSE Global Minimum Variance 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](#)

3.8 **Policy for Benchmark Methodology Changes**

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

[Policy for Benchmark Methodology Changes.pdf](#)



Section 4

Eligible Securities

4.0 Eligible Securities

4.1 The FTSE Global Minimum Variance Index Series will consist of constituents of the corresponding underlying universe at the time of the semi-annual review.²

4.2 The FTSE Developed ex Selected Countries Minimum Variance Index will consist of constituents of the FTSE Developed Index, excluding:

- constituents from Hong Kong, Greece*, Ireland, Israel, South Korea, Poland and Portugal
- constituents that are classified in the Industry Classification Benchmark (ICB) Subsector Tobacco (3785)
- constituents whose company full market capitalisation (before the application of any investability weighting) is less than HKD 5bn as of the close of business on the Monday 4 weeks prior to the review effective date

* Greece will be excluded in case it is classified as a developed country

4.3 All aspects of the management of index calculation, underlying constituent review and company classification for constituents of the FTSE Global Minimum Variance Index Series are as described in the underlying index Ground Rules.

² Saudi Arabia was assigned Secondary Emerging market status in March 2019. Securities will be eligible for inclusion in the FTSE Global Minimum Variance Index Series from September 2019.

China A Shares (available under the Northbound China Stock Connect Scheme) was assigned Secondary Emerging market status beginning in June 2019. Securities will be eligible for inclusion in the FTSE Global Minimum Variance Index Series from September 2019.



Section 5

Periodic Review of Constituent Companies

5.0 Periodic Review of Constituent Companies

5.1 Review Dates

- 5.1.1 The semi-annual review will be implemented after the close of trading on the third Friday of the months set out in the following table, except the June review of the Russell 1000 Minimum Variance, which is implemented in conjunction with the Russell US Equity Indexes reconstitution:

FTSE Index	Review Months
FTSE Developed Minimum Variance Index	March & September
FTSE Developed Europe Minimum Variance Index	March & September
FTSE Developed Europe ex UK Minimum Variance Index	March & September
FTSE Developed Eurozone Minimum Variance Index	March & September
FTSE Developed ex Japan Minimum Variance Index	March & September
FTSE Developed ex USA Minimum Variance Index	March & September
FTSE Developed Asia Pacific Minimum Variance Index	March & September
FTSE Developed Asia Pacific ex Japan Minimum Variance Index	March & September
FTSE Developed Asia Pacific ex Japan ex Korea Minimum Variance Index	March & September
FTSE Developed Asia Pacific ex Korea Minimum Variance Index	March & September
FTSE Developed World ex Korea ex Israel Minimum Variance Index	March & September
FTSE Developed ex Selected Countries Minimum Variance Index	March & September
FTSE All-World Minimum Variance Index	March & September
FTSE North America Minimum Variance Index	March & September
FTSE Emerging Minimum Variance Index	March & September
FTSE Developed Shariah Minimum Variance Index	March & September
FTSE4Good Developed Minimum Variance Index	June & December
FTSE ASFA Australia 300 Minimum Variance Index	March & September
FTSE Japan Minimum Variance Index	March & September
FTSE Korea Minimum Variance Index	March & September
FTSE Thailand Mid/Small Cap Minimum Variance Index	March & September
FTSE UK Minimum Variance Index	March & September
FTSE USA Minimum Variance Index	March & September

FTSE China A Free Minimum Variance Index	March & September
Russell 1000 Minimum Variance Index	June & December
Russell 2000 Minimum Variance Index	June & December
FTSE/JSE Top 40 Minimum Variance Index	March & September
FTSE/JSE All-Share Minimum Variance Index	March & September

5.2 Review Procedure

For each index comprising the FTSE Global Minimum Variance Index Series, an optimisation algorithm is used to determine the weighting scheme applied to the constituents of the corresponding underlying index. The algorithm will be applied at the security level. Closing price data on the Wednesday before the first Friday of a review month are used to determine the weighting scheme in the FTSE Global Minimum Variance Index, based on the underlying constituents effective from the Monday following the third Friday of the same month, except the June review of the Russell 1000 Minimum Variance and Russell 2000 Minimum Variance Index, which are based on the underlying constituents effective on the Russell 1000 Index and Russell 2000 Index annual reconstitution date.

Section 6

Weighting Methodology

6.0 Weighting Methodology

6.1 Covariance Matrix

In the following “FTSE Global Minimum Variance Index” refers to a component index of the FTSE Global Minimum Variance Index Series.

Daily arithmetic business day total returns are used to derive the covariance matrix. These are defined by:

$$r_{i,t} = \frac{e_{i,t} \times (p_{i,t} + d_{i,t})}{e_{i,t-1} \times p_{i,t-1}} - 1$$

where $e_{i,t}$ is the exchange rate converting prices in local currencies to a common currency (see table below), $p_{i,t}$ is the adjusted price and $d_{i,t}$ is the adjusted dividend for the i^{th} stock at time t .

The following currency base applies to the determination of the covariance matrix for each index:

Index	Currency
FTSE Developed Minimum Variance Index	USD
FTSE Developed Europe Minimum Variance Index	EUR
FTSE Developed Europe ex UK Minimum Variance Index	GBP
FTSE Developed Eurozone Minimum Variance Index	EUR
FTSE Developed ex Japan Minimum Variance Index	JPY
FTSE Developed ex USA Minimum Variance Index	USD
FTSE Developed Asia Pacific Minimum Variance Index	USD
FTSE Developed Asia Pacific ex Japan Minimum Variance Index	USD
FTSE Developed Asia Pacific ex Japan ex Korea Minimum Variance Index	USD
FTSE Developed Asia Pacific ex Korea Minimum Variance Index	USD
FTSE Developed World ex Korea ex Israel Minimum Variance Index	USD
FTSE Developed ex Selected Countries Minimum Variance Index	HKD
FTSE All-World Minimum Variance Index	USD
FTSE North America Minimum Variance Index	USD
FTSE Emerging Minimum Variance Index	USD
FTSE Developed Shariah Minimum Variance Index	USD
FTSE4Good Developed Minimum Variance Index	USD
FTSE ASFA Australia 300 Minimum Variance Index	AUD
FTSE Japan Minimum Variance Index	JPY
FTSE Korea Minimum Variance Index	KRW
FTSE Thailand Mid/Small Cap Minimum Variance Index	THB
FTSE UK Minimum Variance Index	GBP
FTSE USA Minimum Variance Index	USD
FTSE China A Free Minimum Variance Index	CNY
Russell 1000 Minimum Variance Index	USD
Russell 2000 Minimum Variance Index	USD
FTSE/JSE Top 40 Minimum Variance Index	ZAR
FTSE/JSE All-Share Minimum Variance Index	ZAR

The volatility and correlation estimation period is defined by the number of business days in the two years prior to a review date.

$$\text{Volatility: } \delta_{i,T} = \sqrt{\frac{1}{T_{\delta}-1} \sum_{t=T-T_{\delta}+1}^T (r_{i,t} - \bar{r}_i)^2}$$

where T_{δ} = volatility estimation period (approx 500 to 520 days).

$$\text{Correlation: } \rho_{ij,T} = \frac{\left[\frac{1}{(T_{\rho}-1)} \sum_{t=T-T_{\rho}+1}^T (r_{i,t} - \bar{r}_i)(r_{j,t} - \bar{r}_j) \right]}{\delta_{i,T} \delta_{j,T}}$$

where T_{ρ} = correlation estimation period (approx 500 to 520 days).

$$\text{Empirical Covariance Matrix: } \Omega_{ij,T} = \delta_{i,T} \delta_{j,T} \rho_{ij,T}$$

Minimum Number of Observations: The minimum number of daily returns contained in the two year period prior to a review date is 360. Stocks not meeting this threshold have their weights set to zero and are not included in the FTSE Global Minimum Variance Index.

Minimum Number of Coincident Observations: Correlations are calculated using at least 300 coincident observations. If this is not achieved, the stock that has 300 coincident observations with the fewest other stocks in the covariance matrix is removed. If this yields more than one stock, the stock with highest volatility is removed. The removal of stocks continues until the correlation between any two remaining stocks can be calculated using least 300 coincident returns. Stocks that are removed have their weights set to zero and are not included in the FTSE Global Minimum Variance Index.

PCA Covariance Matrix: A covariance matrix based on a Principal Component Analysis (PCA) of the $N \times N$ empirical covariance matrix is used.

PCA Covariance Matrix: A covariance matrix based on a Principal Component Analysis (PCA) of the $N \times N$ empirical covariance matrix is used.

Let $\lambda_1, \dots, \lambda_K$ be the K eigenvalues of the empirical correlation matrix $\rho_{ij,T}$ that are bigger than $1 + N/T_\delta + 2\sqrt{N/T_\delta}$ and let $\bar{A}_1, \dots, \bar{A}_K$ be their associated eigenvectors each with N elements.

Let D_{nm} be the $K \times K$ diagonal matrix with $D_{nn} = \lambda_n$ and P_{nj} be the $K \times N$ matrix whose n^{th} row is given by \bar{A}_n . One then constructs the $N \times N$ PCA correlation matrix as $\phi = P^T D P$. The diagonal elements of ϕ are additionally constrained to be equal to one.

The PCA covariance matrix is then defined by: $C_{ij,T} = \delta_{i,T} \delta_{j,T} \phi_{ij,T}$

6.2 Objective Function

Objective: Minimise portfolio volatility $\sigma^2 = \sum_{i=1}^N \sum_{j=1}^N w_i C_{ij,T} w_j$

Where w_i is the weight of the i^{th} stock.

6.3 Constraints

Weights are determined in order to minimise the objective function, subject to the following constraints:

Long Only Constraint: $w_i \geq 0 \quad \forall_i$

Fully Invested: $\sum_{i=1}^N w_i = 1$

Upper Stock Limit: $w_i \leq w_{max} \quad \forall_i$

Maximum Weight Multiple: The maximum multiple of the underlying market capitalisation weight in the FTSE Global Minimum Variance Index is 20 times. The maximum weight multiple of the FTSE Thailand Mid/Small Cap Minimum Variance Index is 10 times.

Country Constraint: Let the weight of a given country be $X\%$ in the underlying index. Then that country's weight in the Minimum Variance Index will be bounded by:

$$\text{Max}(0.9 X - 5.0, 0.0) \text{ and } \text{Min}(1.1 X + 5.0, 100.0)$$

Where the upper stock limit/maximum weight multiple is inconsistent with the lower country bound, the lower country bound is replaced by the sum of the minimum of the upper stock limit and the weight implied by the maximum weight multiple over all eligible stocks.

Upper ICB Industry Group Sector Limit: Maximum weight contribution of a particular Industrial Group should be less than or equal to $S_{max}\%$.

Diversification Target: $\sum_{i=1}^N w_i^2 = \frac{1}{H}$. This constraint ensures that there are at least H stocks in the index at rebalance.

Effective Zero Weight Threshold: Any optimised stock weight that is less than 1 basis points is treated as having a zero weight in the FTSE Global Minimum Variance Index. Any resulting excess

weight will be redistributed amongst the remaining stocks and may cause slight breaches of the above constraints.

The precise values of the variable constraints for each of the indexes in the series are summarised in the following table:

FTSE Index	Upper Stock Limit	Diversification Target	ICB Group Sector Limit
FTSE Developed Minimum Variance Index	1.0%	1000	20%
FTSE Developed Europe Minimum Variance Index	1.5%	250	20%
FTSE Developed Europe ex UK Minimum Variance Index	2.0%	200	20%
FTSE Developed Eurozone Minimum Variance Index	2.0%	150	20%
FTSE Developed ex Japan Minimum Variance Index	1.5%	700	20%
FTSE Developed ex USA Minimum Variance Index	1.5%	700	20%
FTSE Developed Asia Pacific Minimum Variance Index	1.5%	400	20%
FTSE Developed Asia Pacific ex Japan Minimum Variance Index	2.0%	150	20%
FTSE Developed Asia Pacific ex Japan ex Korea Minimum Variance Index	2.0%	100	20%
FTSE Developed Asia Pacific ex Korea Minimum Variance Index	1.5%	350	20%
FTSE Developed World ex Korea ex Israel Minimum Variance Index	1.5%	900	20%
FTSE Developed ex Selected Countries Minimum Variance Index	1.5%	900	20%
FTSE All-World Minimum Variance Index	1.0%	1500	20%
FTSE North America Minimum Variance Index	1.5%	350	20%
FTSE Emerging Minimum Variance Index	1.5%	400	20%
FTSE Developed Shariah Minimum Variance Index	1.5%	400	20%
FTSE4Good Developed Minimum Variance Index	1.5%	350	20%
FTSE ASFA Australia 300 Minimum Variance Index	2.0%	150	20%
FTSE Japan Minimum Variance Index	2.0%	200	20%
FTSE Korea Minimum Variance Index	4.5%	50	20%
FTSE Thailand Mid/Small Cap Minimum Variance Index	4.5%	30	20%
FTSE UK Minimum Variance Index	4.5%	60	20%
FTSE USA Minimum Variance Index	1.5%	300	20%
FTSE China A Free Minimum Variance Index	2.0%	200	20%
Russell 1000 Minimum Variance Index	1.5%	500	20%
Russell 2000 Minimum Variance Index	1.5%	500	20%
FTSE/JSE Top 40 Minimum Variance Index	7.5%	20	20%
FTSE/JSE All-Share Minimum Variance Index	2.0%	80	20%

Upper stock weight limits for each index are determined by reference to the relevant diversification target.

Diversification Target	Upper Stock Limit
<= 20	7.5%
> 20 & <= 75	4.5%
> 75 & <= 200	2.0%
> 200 & <= 900	1.5%
> 900	1.0%

The diversification target is set such that at least half the constituents of the underlying index are members of the corresponding FTSE Global Minimum Variance Index. Diversification constraints and consequently upper stock weight limits will be subject to review at each semi-annual review.

6.4 **Suspensions: FTSE China A Free Minimum Variance Index Review**

Existing suspended constituents of the FTSE China A Free Minimum Variance Index at the time of the index review remain members of the Index and take part in the optimization with their weights constrained to be unchanged pre and post the index review.

Suspended stocks that are not constituents of the FTSE China A Free Minimum Variance Index at the index review are ineligible and do not form part of the optimisation and consequently will not be a constituent of the Minimum Variance Index following the index review.

The suspension status of a stock is determined on the price cut-off day.



Section 7

Changes to Constituent Companies

7.0 Changes to Constituent Companies

7.1 Intra-review Additions

7.1.1 Additions into a FTSE Global Minimum Variance Index will be considered for inclusion at the next semi-annual review.

7.2 Intra-review Deletions

7.2.1 A constituent will be removed from a FTSE Global Minimum Variance Index if it is also removed from its corresponding underlying Index. The deletion will be concurrent with its deletion from the underlying Index and its weight will be distributed pro-rata amongst the remaining constituents in the FTSE Global Minimum Variance Index. If the index is a Russell derived FTSE Global Minimum Variance Index a minimum of 2 days notice will be provided and its weight will be distributed pro-rata amongst the remaining constituents in the relevant index.

7.2.2 A constituent will be removed from the FTSE Developed ex Selected Countries Minimum Variance Index if its company full market capitalisation (before the application of any investability weighting) is less than HKD 5bn as of the close of business on the Monday 4 weeks prior to the Monday after the third Friday in June and December. The removal will be made effective from the Monday after the third Friday in June and December.



Section 8

Corporate Actions and Events

8.0 Corporate Actions and Events

- 8.1 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 corresponding FTSE Global Minimum Variance Index remains unchanged pre and post such an event.
- 8.2 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. These include the following:

- Capital Repayments
- Rights Issues/Entitlement Offers
- Stock Conversion
- Splits (sub-division) / Reverse splits (consolidation)
- Scrip issues (Capitalisation 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 Russell will provide notice advising of the timing of the change.

8.3 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 9

Index Calculation

9.0 Index Calculation

9.1 Calculation Frequency

9.1.1 The FTSE Global Minimum Variance Index Series will be calculated in real time using real time prices.

9.2 Index Calculation

9.2.1 The FTSE Global Minimum Variance Index Series will be displayed to two decimal points.

9.2.2 The FTSE Global Minimum Variance Index Series is calculated using the following formula:

$$\sum_{i=1}^N \frac{(p_i \times e_i \times s_i \times f_i \times c_i)}{d}$$

Where,

- $i=1,2,\dots,N$
- N is the number of securities in the Minimum Variance 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 (WAF) to be applied to a security to correctly weight that security in the index. This factor maps the investable market capitalisation of each stock to a notional market capitalisation 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: Index Opening and Closing Hours

The following indexes are calculated in real time, between the hours shown in the table. Closing values using the WM/Reuters Closing Spot Rates™ at 16:00 UK time are disseminated after these exchange rates have been applied to the close price for constituent stocks.

Index	Open	Close
FTSE Developed Minimum Variance Index	08:30	21:10
FTSE USA Minimum Variance Index	14:30	21:10
FTSE Japan Minimum Variance Index	00:30	06:45
FTSE Developed Europe Minimum Variance Index	08:00	16:30
FTSE Developed Europe ex UK Minimum Variance Index	08:30	16:30
FTSE Developed Eurozone Minimum Variance Index	08:30	16:30
FTSE Developed Asia Pacific Minimum Variance Index	00:30	13:30
FTSE Developed Asia Pacific ex Japan Minimum Variance Index	00:30	13:30

*Note: Timings are UK hours.

Indexes that disseminate until 21:10 will have the closing value disseminated at 21:30.



Appendix B: Status of Index Series

The FTSE Global Minimum Variance Index Series which are calculated in real time may exist in the following states.

A) Firm

- i) The indexes are being calculated during Official Market Hours. No message will be displayed against the index value.
- ii) The Official Closing Price for the FTSE Global Minimum Variance Index Series will be the London Stock Exchange Official Closing Price.

B) Closed

The indexes have ceased all calculations for the day. The message 'CLOSE' will be displayed against the index value calculated by FTSE Russell.

C) Held

During Official Market Hours, an index has exceeded pre-set operating parameters and the calculation has been suspended pending resolution of the problem. The message 'HELD' will be displayed against the last index value calculated by FTSE Russell.

D) Indicative

If there is a system problem or situation in the market that is judged to affect the quality of the constituent prices at any time when an index is being calculated, the index will be declared indicative (e.g. normally where a 'fast market' exists in the equity market). The message 'IND' will be displayed against the index value calculated by FTSE Russell.

The official opening and closing hours of the FTSE Global Minimum Variance Index Series are set out in Appendix A. Variations to the official hours of the indexes will be published by FTSE Russell.



Appendix C: Further Information

A Glossary of Terms used in FTSE Russell's Ground Rule documents can be found using the following link:

[Glossary.pdf](#)

Further information on the FTSE Global Minimum Variance 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.

Website: www.ftserussell.com

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