Ground Rules

October 2024

FTSE US Preferred Stock and Hybrids Index

v1.7

FTSE RUSSELL
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Contents

Section 1
Introduction

1. Introduction

1.1 FTSE US Preferred Stock and Hybrids Index Series

1.1.1 The FTSE US Preferred Stock and Hybrids Index Series is designed to provide a performance measure of preferred stock and other hybrid instruments issued in the US and denominated in USD.

Hybrid securities exhibit both bond and equity-like features. Preferred stock and other hybrids are distinguished such that:

– Preferred stock represents a class of ownership in a corporation that has a higher claim over assets and earnings than common stock, but is subordinate to bonds. Preferred stock dividends must generally be paid out before dividends to common stockholders and can be deferred without triggering default of the company.

– Other hybrid securities are often loss absorbing, with coupons that can be deferred or suspended without triggering default. They may be perpetual, dated or have extendable maturity dates.

1.2 Ground Rules

1.2.1 This document sets out the Ground Rules for the construction and maintenance of the FTSE US Preferred Stock and Hybrids Index Series. Copies of these Ground Rules are available from FTSE Russell (see **Error! Reference source not found.**).

1.3 Index Construction Methodology

1.3.1 The FTSE US Preferred Stock and Hybrids Index series consists of USD-denominated securities with a legal maturity date and perpetual securities in the US market. Securities that have a minimum USD 100 million amount outstanding for par values of USD 25, 50, 100, and USD 250 million for securities with a par value of USD 1,000.

1.3.2 The following sub-indices are available.

A. Sub-indices based on instrument type:

i. FTSE US Preferred Stock Capped Index

ii. FTSE US Hybrid Security Capped Index

B. Sub-indices based on types of dividend:

i. FTSE US Preferred Stock and Hybrids Fixed Rate Capped Index

ii. FTSE US Preferred Stock and Hybrids Floating Rate Capped Index

C. Sub-indices based on ICB sectors:

i. FTSE US Preferred Stock and Hybrids Financials Capped Index

ii. FTSE US Preferred Stock and Hybrids Financials ex REITs Capped Index

iii. FTSE US Preferred Stock and Hybrids Utilities Capped Index

    iv. FTSE US Preferred Stock and Hybrids Services Capped Index
    v. FTSE US Preferred Stock and Hybrids Agencies Capped Index
    vi. FTSE US Preferred Stock and Hybrids REITs Capped Index
    vii. FTSE US Preferred Stock and Hybrids Infrastructure Capped Index
    viii. FTSE US Preferred Stock and Hybrids Financial Capped Index
    ix. FTSE US Preferred Stock and Hybrids Ex-Financials Capped Index
    x. FTSE US Regulatory Capital Capped Index

D. Sub-indices based on credit rating:

    i. FTSE US Preferred Stock and Hybrids Investment-Grade Capped Index
        - AAA, AA, A, BBB
    ii. FTSE US Preferred Stock and Hybrids High-Yield Capped Index
        - BB, B, CCC, CC, C
    iii. FTSE US Preferred Stock and Hybrids Not Rated Capped Index
    iv. FTSE US Preferred Stock and Hybrids High-Yield and Not Rated Capped Index
    v. FTSE US Preferred Stock Investment-Grade and High-Yield Capped Index

E. Sub-indices based on US Russell 3000 equity index membership:

    i. FTSE US Russell 3000 Preferred Stock and Hybrids Capped Index
    ii. FTSE US Non-R3 Preferred Stock and Hybrids Capped Index

F. Sub-indices based on listing status:

    i. FTSE US Preferred Stock and Hybrids Exchange-listed Capped Index
    ii. FTSE US Preferred Stock and Hybrids OTC Capped Index

G. Sub-indices based on par value:

    i. FTSE US Preferred Stock and Hybrids Par 25, 50, 100 Capped Index
    ii. FTSE US Preferred Stock and Hybrids Par 1,000 Capped Index

1.3.3 Price, total return and net of withholding tax return indices are calculated on an end-of-day basis. Dividends are included in the total return and net of withholding tax return indices based on their ex-dividend dates. The following analytics are also calculated:

    i. Annual dividend/coupon yield
    ii. Yield to maturity
    iii. Yield to call
    iv. Yield to worst
    v. Macaulay duration
    vi. Modified Duration
    vii. Duration to worst
    viii. Convexity
    ix. Average life
    x. OAS

1.3.4 The base currency of the index is US Dollars (USD). Index returns are calculated in AUD, CAD, CHF, CNY, EUR, GBP, HKD, JPY and SGD

1.3.5 The FTSE US Preferred Stock and Hybrids Index does not take account of ESG factors in its index design.

1.4 IOSCO

1.4.1 FTSE considers that the FTSE US Preferred Stock and Hybrids Index Series meets the IOSCO Principles for Financial Benchmarks as published in July 2013.

1.5 FTSE Russell

FTSE Russell is a trading name of FTSE International Limited, Frank Russell Company, FTSE Global Debt Capital Markets Limited (and its subsidiaries FTSE Global Debt Capital Markets Inc. and FTSE Fixed Income Europe Limited), FTSE Fixed Income LLC, FTSE (Beijing) Consulting Limited, Refinitiv Benchmark Services (UK) Limited, Refinitiv Limited and Beyond Ratings.

1.5.1 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.

1.5.2 Index series 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 series’ 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 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 inaccuracies in the compilation or any constituent data in the index series.

Section 2

Management responsibilities

2. 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 the periodic index reviews of the index series and apply the changes resulting from the reviews as required by the Ground Rules;

– publicise 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 (at least once a year) by FTSE Russell to ensure that they best reflect the aim 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 Index Governance Board before approval is granted.

[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) and The Benchmarks (Amendment and Transitional Provision) (EU Exit) Regulations 2019 (the UK Benchmark Regulation).

Section 3

FTSE Russell index policies

3. 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 Queries and Complaints

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

Benchmark_Determination_Complaints_Handling_Policy.pdf

3.2 Statement of Principles for FTSE Russell Equity Indices (the Statement of Principles)

Indices 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 the FTSE Russell Index Governance Board.

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

Statement_of_Principles.pdf

3.3 Index Policy for Trading Halts and Market Closures

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

FTSE_Russell_Index_Policy_for_Trading_Halts_and_Market_Closures.pdf

3.4 Index Policy in the Event Clients are Unable to Trade a Market or Security

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

FTSE_Russell_Index_Policy_in_the_Event_Clients_are_Unable_to_Trade_a_Market_or_a_Security.pdf

3.5 Recalculation Policy and Guidelines

3.6 Where an inaccuracy is identified, FTSE Russell will follow the steps set out in the FTSE Russell Index Recalculation Guidelines when determining whether an index or index series should be recalculated and/or associated data products reissued. Users of the FTSE US Preferred Stock and Hybrids Index Series will be notified through appropriate media.

Fixed_Income_Recalculation_Policy_and_Guidelines.pdf

3.7 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

3.8 FTSE Russell Governance Framework

3.8.1 To oversee its indices, FTSE Russell employs a governance framework that encompasses product, service and technology governance. The framework incorporates the London Stock Exchange Group's three lines of defence risk management framework and is designed to meet the requirements of the IOSCO Principles for Financial Benchmarks[2], the European benchmark regulation[3] and the UK benchmark regulation[4]. The FTSE Russell governance framework can be accessed using the following link:

FTSE_Russell_Governance_Framework.pdf

3.9 Real Time Status Definitions

3.9.1 Please refer to the following guide for details of real time status definitions for indices that are calculated in real time

Real Time Status Definitions.pdf

[2] IOSCO Principles for Financial Benchmarks Final Report, FR07/13 July 2013.

[3] 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.

[4] The Benchmarks (Amendment and Transitional Provision) (EU Exit) Regulations 2019.

Section 4

Corporate actions and events

4. Corporate actions and events

4.1 Full details of changes to constituent companies due to corporate actions and events can be accessed in the Corporate Actions and Events Guide using the following link:

Corporate_Actions_and_Events_Guide.pdf

4.2 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 will provide notice advising of the timing of the change.

Section 5

Qualification criteria and periodic review of constituents

5. Qualification criteria and periodic review of constituents

5.1 Review date

5.1.1 The FTSE US Preferred Stock and Hybrids Index Series is reviewed on a monthly basis, a profile fixing date is set ahead of each month-end to freeze the index constituents. Index changes take effect at the open of the first business day of the following month.

5.1.2 On each index review date, index eligibility for the following month's index profile is determined. Between the review date and calendar month-end, market activities will continue to be tracked and issues that are called, tendered, or defaulted will be removed.

5.1.3 The index series are calculated Monday through Friday except Christmas Day (observed) and New Year's Day (observed)[5]. If the market is on holiday, the closing prices used for that day will be the closing prices from the previous day.

5.2 Fixing date

5.2.1 The annual schedule of fixing dates is made available on the FTSE Russell website – Fixed Income indices

5.3 Responsibilities and reporting

5.3.1 FTSE Russell will be responsible for conducting the monthly review of constituents of the FTSE US Preferred Stock and Hybrids Index Series.

5.4 Review process

5.4.1 The monthly review is designed to provide stability in the constituents of the FTSE US Preferred Stock and Hybrids Index Series while ensuring that the index series continues to be representative of the market.

5.4.2 All securities that satisfy rules outlined in 5.4 are eligible constituents of the FTSE US Preferred Stock and Hybrids Index Series.

5.5 FTSE US Preferred Stock and Hybrids Index Series eligibility criteria

5.5.1 The following security types and features are eligible for the index

- Securities with par amounts of USD 25, USD 50, USD 100 and USD 1,000 are eligible
- Securities must meet the minimum par amount outstanding as of month-end rebalance as follows:
- Minimum of USD 100 million amount outstanding for par amounts USD 25, USD 50, USD 100
- Minimum of USD 250 million amount outstanding for par amounts USD 1,000

[5] Prior to 1 August 2023, the index series followed the US SIFMA Holiday schedule.

- Securities with a minimum maturity of at least one year as of the rebalance effective date, which is usually the first business day of the month, assuming T+0 settlement.
- Securities with fixed and floating dividends/coupons are eligible, including securities that switch from fixed to floating rate after a period of time. Dividends/coupons may be cumulative or non-cumulative.
- Hybrid securities must feature a deferrable dividend/coupon that does not trigger default of the issuer.
- Baby bonds[6] are eligible
- Securities may be perpetual or have a legal maturity date
- Securities with payment frequency of annual, semi-annual, quarterly and monthly.
- Generally, convertible securities are excluded. However, securities issued with conversion at regulator's discretion are eligible. Securities that convert to common equity or suffer principal write-downs based on explicit balance-sheet or regulatory capital pre-specified triggers are not eligible for the index. Securities that can be converted at the discretion of local regulators are eligible if they meet other index inclusion criteria.

5.6 Ineligible securities

The following security types and features are ineligible for the index:

- Pay-in-part, pay-in-kind, strippable, and inflation-linked securities
- Convertible securities
- Structured products
- Secured instruments, with the exception of baby bonds and preferred stocks
- Preferred stocks linked to a basket of securities or index
- Sinking funds
- Securities where it is not possible to determine future cash flows. For example, where the coupon/dividends are at the issuer's discretion, or where it is not possible to determine the formula for the calculation of coupons/dividends in case of floating rate securities
- Securities with irregular payment schedules
- Securities with payment frequency of longer than 1 year
- Preferred Stocks issued under US Rule 144A without registration rights
- Private placements
- Tier 2 instruments that conform to Basel III issued with par $USD 1,000
- Security types which are not covered by the Yield Book analytics platform
- Securities without a price

5.6.1 Securities belonging to the following ICB classification[7] are not eligible for inclusion:

ICB Code	ICB Sector
302040	Closed End Investments
ICB Code	**ICB Subsector**
30205000	Open End and Miscellaneous Investment Vehicles
40201010	Education Services

[6] Baby bonds are the bonds where the par amount is USD 25, that may or may not have a deferrable coupon feature.
[7] For more information on the FTSE ICB, please see the ICB_Rules.pdf

40501030	Recreational Services

5.7 Price source

5.7.1 Prices for both preferred stocks and hybrid securities are sourced from LSEG Pricing Service.

5.7.2 Preferred stocks

- Where the primary listing is on a US exchange, the last trade price from the primary exchange will be used.
- Where the primary listing is not on a US exchange or the security is traded over-the-counter, LSEG Pricing Service evaluated bid prices will be used as of 4:00 p.m. (New York) time.

5.7.3 Hybrid securities

- LSEG Pricing Service evaluated bid-side prices as of 4:00 p.m. (New York) time.

5.8 Price quality

5.8.1 Eligible constituents must have had at least one price update during the review month.

5.9 Credit quality

5.9.1 An index credit rating is assigned using ratings from Moody's, S&P and Fitch. The most common rating is used. If all three are different, the middle rating is used. If only two are available, the lower rating is used. If only one rating is available, that rating is used. If no rating is available, an issuer rating may be used.

5.10 Sector classification

5.10.1 The FTSE US Preferred Stock and Hybrids Index utilizes ICB, a proprietary industry and sector categorization schema. Securities without an ICB classification are not eligible for index inclusion.

5.11 Multiple lines

5.11.1 Where a company issues multiple lines of preferred stock, all eligible lines are included in the FTSE US Preferred Stock and Hybrids Index Series and priced separately. However, a capping rule, as described in Rule 5.10, is applied.

5.12 Capping rules

5.12.1 The constituents used to calculate capping factors will be indicative constituents at the monthly review, which incorporates additions/deletions and shares in issue/amounts outstanding updates. The capping factors will be effective at the open on the first business day of the following month.

5.12.2 The objective of capping the FTSE US Preferred Stock and Hybrids Index Series is to achieve no greater than 10% aggregate weights in each issuer.

5.13 Capping methodology

5.13.1 Step 1: If the aggregate weight of an issuer is greater than 10%, its weight is capped at 10% and excess weight will be distributed pro-rata amongst the uncapped issuers.

5.13.2 Step 2: If the distribution of excess weight results in any issuer breaching the 10% cap, Step 1 will be repeated. This process will be repeated until all the issuer weights in the index are less than or equal to 10%

5.13.3 Step 3: If it is not possible to cap all the issuers at 10%, the capping limit will be raised by 0.5% and Steps 1 and 2 will be repeated. The capping limit will be incrementally raised by 0.5% until all the issuers are capped.

5.14 Stale prices

5.14.1 Where no price updates are received, the last good price will be used until the next rebalance. If no price update is received before the next rebalance, the constituent will be dropped when the rebalance is applied the following month.

5.15 Last Good Price

5.15.1 Last good price is the price that has passed FTSE's controls, has been validated by the Index Management and used in the index calculation. This price may and can be 0 (zero).

5.16 Settlement

5.16.1 T+0 settlement assumption is used for the valuation and analytics.

5.17 Sub-indices

If the index has no eligible constituents, the index value will be held at the last good value.

5.17.1 The index will come out of suspension when eligible constituent(s) are available.

5.18 Base date

5.18.1 The base date for the index is 30 December, 2005.

Section 6

Changes to constituent companies

6. Changes to constituent companies

6.1 Corporate actions

Corporate Actions	Adjustments	Adjustment Timing: Immediately	Adjustment Timing: Next Review Date
Full Call	Where an issue is fully called between rebalance dates, it is maintained in the index at the call price until the next rebalance date.		✓
Partial Call	Where an issue is partially called between rebalance dates, the called portion is retained in the index at the call price until the next monthly rebalance, at which point it is removed. The remaining or un-called portion will be priced using the daily price and will remain in the index at a reduced weighting until the next monthly rebalance. The un-called portion will remain a member of the index after the next rebalance if it continues to remain eligible in all other respects.		✓
Partial Repurchase	Where a company buys back a portion of an issue between rebalance dates, the re-purchased portion will remain in the index at market price until the next rebalance date.		✓
Full Repurchase	If an issue is fully repurchased by the issuer, it will remain in the index at the transaction price until the next rebalance date.		✓
Special Dividend	Special dividends may occur when a cumulative issue suspends its payments for a period of time and subsequently resumes the payment of dividends. In this case a special dividend, equal to the sum of the omitted dividend payments will be paid and held as cash in the index until next rebalance.		✓
Suspended Dividend/ Deferred Coupon	Where a company announces that a coupon or dividend payment is deferred or suspended, or a company misses a coupon payment, the deferral treatment will be applied as described below. For non-cumulative securities, the security is carried forward until next rebalance, where it is then removed at market price. For cumulative securities, the omitted payments are accrued. Once paid as a special dividend/coupon, the dividend or coupon is held as cash in the index until next rebalance.		✓
Default	If an issue receives a default rating from any rating agency, the issue will be carried forward at last market closing price until next rebalance, where it is removed at market price.		✓

Insolvency/Bankruptcy	If an entity is declared insolvent and/or files for bankruptcy, its issues will be carried forward at last good price until next rebalance, where it is removed at last good price.		✓
Listing	If a security, which is trading OTC and subsequently lists on a recognized US exchange, it will continue to be treated as an OTC security and evaluated prices will be used until next rebalance. At the next rebalance the security will move from the OTC sub-index to the Exchange Listed sub-index, subject to it meeting the eligibility criteria. From there on exchange traded prices will be used. This may not result in any turnover to the headline index.		✓
Delisting	If a security, which is listed on a recognized US exchange and subsequently delists, it will continue to be treated as an exchange listed security and in the absence of traded prices, last good exchange traded price will be used until next rebalance. At the next rebalance the security will move from the Exchange Listed sub-index to the OTC sub-index, subject to it meeting the eligibility criteria. From there on evaluated prices will be used. This may not result in any turnover to the headline index.		✓
Coupon Type Fixed to Float	Where a security switches from fixed rate coupon to floating rate, the analytics will be based on the floating rate. To avoid unnecessary turnover, the security will continue to be in the fixed rate sub-index and at next rebalance will move to the floating rate sub-index, subject to it meeting the eligibility criteria. This may not result in any turnover to the headline index.	✓	✓

6.2 Intra-rebalance additions

6.2.1 There is no fast entry to the FTSE US Preferred Stock and Hybrids Index Series. New issuance and additions will be included in the index at the next rebalance date if the issue is eligible in all respects.

6.3 Intra-rebalance deletions

6.3.1 There will be no intra-rebalance deletions.

6.4 Mergers and take-overs on impact on Russell 3000 sub-index inclusion

		Is Acquirer a member of Russell 3000 Index?	
		Yes	**No**
Is Preferred Stock Being Retired?	**Yes**	The preferred stock remains in the index at the transaction price until the next rebalance	The preferred stock remains in the index at the transaction price until the next rebalance.
	No	The preferred stock remains in the index at the daily traded price	The preferred stock remains in the index at the transaction price until the next rebalance.

Section 7

Algorithm and calculation methodology

7. Calculation methodology

7.1 Index

7.1.1 Total return index

The FTSE US Preferred Stock and Hybrids Index Series is calculated using the following formula:

$$TRI(t) = TRI(t-1) \times \frac{\sum_{i=1}^{n(r)}\left((p_i(t) \times s_i(t) \times af_i(r) + Cash_i(t))\right)}{\sum_{i=1}^{n(r)}\left((p_i(t-1) \times s_i(t-1) \times af_i(r) + Cash_i(t-1))\right)}$$

where,

- $TRI(t)$ is the total return index value on calculation day t
- $n(r)$ is the number of constituents in the Index, at rebalance day r.
- $p_i(t)$ is dirty price of the security $\begin{cases} if\ quoted\ clean\ then\ closing\ price + accrued\ interest \\ if\ quoted\ dirty\ then\ closing\ price \end{cases}$ of constituent i on calculation day t
- $s_i(t)$ is $\begin{cases} if\ quoted\ in\ percentage\ of\ par\ then\ \frac{amount\ Outstanding}{100} \\ if\ quoted\ in\ currency\ units\ then\ \frac{amount\ Outstanding}{par\ value} \end{cases}$ of constituent i on calculation day t
- $af_i(r)$ is the adjustment factor comprising of either capping factor or fundamental factor or all, of constituent i on rebalance day r. If not applicable, then the value is set to 1
- $Cash_i(t)$ is $\begin{cases} if\ debt\ security\ then\ coupon \\ if\ preferred\ stock\ then\ dividend \end{cases}$ of constituent i on calculation day t

7.1.2 Price index

$$PI(t) = PI(t-1) \times \frac{\sum_{i=1}^{n}\left((p_i(t) \times s_i(t) \times af_i(r))\right)}{\sum_{i=1}^{n}\left((p_i(t-1) \times s_i(t) \times af_i(r))\right)}$$

where,

- $PI(t)$ is the price index value on calculation day t
- $n(r)$ is the number of constituents in the Index, at rebalance day r.
- $p_i(t)$ is dirty price of the security $\begin{cases} if\ quoted\ clean\ then\ closing\ price + accrued\ interest \\ if\ quoted\ dirty\ then\ closing\ price \end{cases}$ of constituent i on calculation day t

– $s_i(t)$ is $\begin{cases} if\ quoted\ in\ percentage\ of\ par\ then\ \frac{amount\ Outstanding}{100} \\ if\ quoted\ in\ currency\ units\ then\ \frac{amount\ Outstanding}{par\ value} \end{cases}$ of constituent i on calculation day t

– $af_i(r)$ is the adjustment factor comprising of either capping factor or fundamental factor or all, of constituent i on rebalance day r. If not applicable, then the value is set to 1

7.1.3 Market Cap

$$MC(t) = \sum_{i=1}^{n} p_i(t) \times s_i(t) \times af_i(r)$$

where,

– $MC(t)$ is the market capitalisation on calculation day t

– $n(r)$ is the number of constituents in the Index, at rebalance day r.

– $p_i(t)$ is dirty price of the security $\begin{cases} if\ quoted\ clean\ then\ closing\ price + accrued\ interest \\ if\ quoted\ dirty\ then\ closing\ price \end{cases}$ of constituent i on calculation day t

– $s_i(t)$ is $\begin{cases} if\ quoted\ in\ percentage\ of\ par\ then\ \frac{amount\ Outstanding}{100} \\ if\ quoted\ in\ currency\ units\ then\ \frac{amount\ Outstanding}{par\ value} \end{cases}$ of constituent i on calculation day t

– $af_i(r)$ is the adjustment factor comprising of either capping factor or fundamental factor or all, of constituent i on rebalance day r. If not applicable, then the value is set to 1

7.1.4 Annual dividend/coupon yield

$$DY(t) = \frac{\sum_{i=1}^{n} dy_i(t) \times mc_i(t)}{MC(t)}$$

where,

– $DY(t)$ is the annual dividend/coupon yield on calculation day t

– $n(r)$ is the number of constituents in the Index, at rebalance day r.

– $dy_i(t)$ is the annual dividend/coupon yield of constituent i on calculation day t

– $mc_i(t)$ is the market capitalisation of constituent i on calculation day t

– $MC(t)$ is the market capitalisation on calculation day t

7.1.5 Yield to maturity

$$YTM(t) = \frac{\sum_{i=1}^{n} ytm_i(t) \times mc_i(t) \times moddur_i(t)}{\sum_{i}^{n} mc_i(t) \times moddur_i(t)}$$

where,

– $YTM(t)$ is the yield to maturity on calculation day t

– $n(r)$ is the number of constituents in the Index, at rebalance day r.

– $ytm_i(t)$ is the yield to maturity of constituent i on calculation day t

– $mc_i(t)$ is the market capitalisation of constituent i on calculation day t

– $moddur_i(t)$ is the modified duration to maturity of constituent i on calculation day t

7.1.6 Yield to call

$$YTC(t) = \frac{\sum_{i=1}^{n} ytc_i(t) \times mc_i(t) \times dtc_i(t)}{\sum_{i}^{n} mc_i(t) \times dtc_i(t)}$$

where,

– $YTC(t)$ is the yield to call on calculation day t
– $n(r)$ is the number of constituents in the Index, at rebalance day r.
– $ytc_i(t)$ is the yield to call of constituent i on calculation day t
– $mc_i(t)$ is the market capitalisation of constituent i on calculation day t
– $dtc_i(t)$ is the modified duration to call of constituent i on calculation day t

7.1.7 Yield to worst

$$YTW(t) = \frac{\sum_{i=1}^{n} ytw_i(t) \times mc_i(t) \times dtw_i(t)}{\sum_{i}^{n} mc_i(t) \times dtw_i(t)}$$

where,

– $YTW(t)$ is the yield to worst on calculation day t
– $n(r)$ is the number of constituents in the Index, at rebalance day r.
– $ytm_i(t)$ is the yield to maturity of constituent i on calculation day t
– $mc_i(t)$ is the market capitalisation of constituent i on calculation day t
– $dtw_i(t)$ is the modified duration to worst of constituent i on calculation day t

7.1.8 Macaulay duration

$$MacDur(t) = \frac{\sum_{i=1}^{n} macdur_i(t) \times mc_i(t)}{MC(t)}$$

where,

– $MacDur(t)$ is the Macaulay duration on calculation day t
– $n(r)$ is the number of constituents in the Index, at rebalance day r.
– $macdur_i(t)$ is the Macaulay duration of constituent i on calculation day t
– $mc_i(t)$ is the market capitalisation of constituent i on calculation day t

$MC(t)$ is the market capitalisation on calculation day t

7.1.9 Modified duration

$$ModDur(t) = \frac{\sum_{i=1}^{n} moddur(m)_i(t) \times mc_i(t)}{MC(t)}$$

where,

– $ModDur(t)$ is the modified duration on calculation day t

- $n(r)$ is the number of constituents in the Index, at rebalance day r.
- $moddur(m)_i(t)$ is the modified duration to maturity of constituent i on calculation day t
- $mc_i(t)$ is the market capitalisation of constituent i on calculation day t
- $MC(t)$ is the market capitalisation on calculation day t

7.1.10 Duration to worst

$$DTW(t) = \frac{\sum_{i=1}^{n} dtw_i(t) \times mc_i(t)}{MC(t)}$$

where,

- $DTW(t)$ is the modified duration on calculation day t
- $n(r)$ is the number of constituents in the Index, at rebalance day r.
- $dtw_i(t)$ is the modified duration to worst of constituent i on calculation day t
- $mc_i(t)$ is the market capitalisation of constituent i on calculation day t
- $MC(t)$ is the market capitalisation on calculation day t

7.1.11 Convexity

$$Cnvxt(t) = \frac{\sum_{i=1}^{n} cnvxt_i(t) \times mc_i(t)}{MC(t)}$$

where,

- $Cnvxt(t)$ is the convexity on calculation day t
- $n(r)$ is the number of constituents in the Index, at rebalance day r.
- $cnvxt_i(t)$ is the convexity of constituent i on calculation day t
- $mc_i(t)$ is the market capitalisation of constituent i on calculation day t
- $MC(t)$ is the market capitalisation on calculation day t

7.1.12 Average life

$$AvgLife(t) = \frac{\sum_{i=1}^{n} avglife_i(t) \times mc_i(t)}{MC(t)}$$

where,

- $AvgLife(t)$ is the average life/term to maturity on calculation day t
- $avglife_i(t)$ is the average life/term to maturity of constituent i on calculation day t
- $mc_i(t)$ is the market capitalisation of constituent i on calculation day t
- $MC(t)$ is the market capitalisation on calculation day t

7.1.13 Option adjusted spread – OAS

$$OAS(t) = \frac{\sum_{i=1}^{n} oas_i(t) \times mc_i(t)}{MC(t)}$$

where,

- $OAS(t)$ is the option adjusted spread on calculation day t
- $n(r)$ is the number of constituents in the Index, at rebalance day r.
- $oas_i(t)$ is the option adjusted spread of constituent i on calculation day t
- $mc_i(t)$ is the market capitalisation of constituent i on calculation day t
- $MC(t)$ is the market capitalisation on calculation day t

7.1.14 Effective Duration

$$EffDur(t) = \frac{\sum_{i=1}^{n} effdur_i(t) \times mc_i(t)}{MC(t)}$$

where,

- $EffDur(t)$ is the Effective Duration on calculation day t
- $effdur_i(t)$ is the effective duration of constituent i on calculation day t
- $mc_i(t)$ is the market capitalisation of constituent i on calculation day t
- $MC(t)$ is the market capitalisation on calculation day t

7.2 Issue level

7.2.1 Market Cap

$$mc_i(t) = p_i(t) \times s_i(t) \times af_i(r)$$

where,

- $mc_i(t)$ is the market capitalisation of constituent i on calculation day t.
- $p_i(t)$ is dirty price of the security $\begin{cases} if\ quoted\ clean\ then\ closing\ price + accrued\ interest \\ if\ quoted\ dirty\ then\ closing\ price \end{cases}$ of constituent i on calculation day t
- $s_i(t)$ is $\begin{cases} if\ quoted\ in\ percentage\ of\ par\ then\ \frac{amount\ Outstanding}{100} \\ if\ quoted\ in\ currency\ units\ then\ \frac{amount\ Outstanding}{par\ value} \end{cases}$ of constituent i on calculation day t
- $af_i(r)$ is the adjustment factor comprising of either capping factor or fundamental factor or all, of constituent i on rebalance day r. If not applicable, then the value is set to 1

7.2.2 Annual dividend/coupon/current yield

The annual dividend/coupon yield of the index is calculated by dividing the annual income by the market capitalisation of the index. The annual income of a constituent is derived from its dividend/coupon rate and is set to zero if the payments are suspended.

$$dy_i(t) = \frac{c_i(t0) \times b_i(t)}{p_i(t)}$$

where,

- $dy_i(t)$ is the annual dividend/coupon yield in percentage terms for constituent i on calculation day t
- $c_i(t)$ is the annual dividend/coupon rate in percentage terms for constituent i on previous payment day $t0$
- $p_i(t)$ is dirty price of the security $\begin{cases} if\ quoted\ clean\ then\ closing\ price + accrued\ interest \\ if\ quoted\ dirty\ then\ closing\ price \end{cases}$ of constituent i on calculation day t.

7.2.3 Yield to maturity

$$p_i(t) = \sum_{k=\frac{v}{d}}^{m+\frac{v}{d}} \frac{cf_i(t1)}{\left(1 + \frac{ytm_i(t)}{f_i}\right)^k}$$

where,

- $p_i(t)$ is dirty price of the security $\begin{cases} if\ quoted\ clean\ then\ closing\ price + accrued\ interest \\ if\ quoted\ dirty\ then\ closing\ price \end{cases}$ of constituent i on calculation day t
- $cf_i(t1)$ is the cash flow due from constituent i at the next payment day $t1$.
- $ytm_i(t)$ is the yield to maturity of constituent i on calculation day t.
- f_i is the number of cash flows per year of constituent i.
- m is denote the number of payment periods until maturity. For perpetual securities the maturity date is set to rolling 100 years from the next cash flow date.
- v is the number of calendar days to next cash flow according the day count convention of constituent i.
- d is the number of calendar days between the previous cash flow and the next cash flow according the day count convention of constituent i.
- k is the time in cash flow periods.

7.2.4 Yield to call

Same as Yield to maturity except the cash flows are up to the next call date rather than the maturity date.

7.2.5 Yield to worst

$$ytw_i(t) = min\left(ytm_i(t), ytc_i(t)\right)$$

where,

- $ytw_i(t)$ is the yield to worst for constituent i on calculation day t
- $ytm_i(t)$ is the yield to maturity for constituent i on calculation day t
- $ytc_i(t)$ is the yield to call for constituent i on calculation day t

7.2.6 Macaulay duration

$$macdur_i(t) = \frac{\sum_{k=\frac{v}{d}}^{m+\frac{v}{d}} \frac{cf_i(t1) \times k}{\left(1 + \frac{ytm_i(t)}{f_i}\right)^k}}{p_i(t) \times f_i}$$

where,

- $macdur_i(t)$ is the Macaulay duration of constituent i on calculation day t.
- $p_i(t)$ is dirty price of the security $\begin{cases} if\ quoted\ clean\ then\ closing\ price + accrued\ interest \\ if\ quoted\ dirty\ then\ closing\ price \end{cases}$ of constituent i on calculation day t
- $cf_i(t1)$ is the cash flow due from constituent i at the next payment day $t1$.
- $ytm_i(t)$ is the yield to maturity of constituent i on calculation day t.
- f_i is the number of cash flows per year of constituent i.
- m is denote the number of payment periods until maturity. For perpetual securities the maturity date is set to rolling 100 years from the next cash flow date.
- v is the number of calendar days to next cash flow according the day count convention of constituent i.
- d is the number of calendar days between the previous cash flow and the next cash flow according the day count convention of constituent i.
- k is the time in cash flow periods.

7.2.7 Modified duration

$$moddur_i(t) = \frac{macdur_i(t)}{(1 + ytm_i(t))}$$

where,

– $moddur_i(t)$ is the modified duration to maturity for constituent i on calculation day t

– $macdur_i(t)$ is the Macaulay duration for constituent i on calculation day t

– $ytm_i(t)$ is the yield to maturity for constituent i on calculation day t

7.2.8 Duration to call

Same as Modified duration to maturity except the cash flows are up to the next call date rather than the maturity date

7.2.9 Duration to worst

$$dtw_i(t) = \frac{mdw_i(t)}{(1 + ytw_i(t))}$$

where,

– $dtw_i(t)$ is the modified duration to worst for constituent i on calculation day t

– $mdw_i(t)$ is the Macaulay duration to worst for constituent i on calculation day t

– $ytw_i(t)$ is the yield to worst for constituent i on calculation day t

7.2.10 Convexity

$$cnvxt_i(t) = \frac{\sum_{k=\frac{v}{d}}^{m+\frac{v}{d}} \left(cf_i(t1) \times \left(\frac{k}{f_i} + \frac{k^2}{f_i^2} \right) \frac{1}{(1+ytm_i)^k} \right)}{p_i(t) \times (1+ytm_i)^2}$$

where,

- $cnvxt_i(t)$ is the convexity of constituent i on calculation day t.
- $p_i(t)$ is dirty price of the security $\begin{cases} if\ quoted\ clean\ then\ closing\ price + accrued\ interest \\ if\ quoted\ dirty\ then\ closing\ price \end{cases}$ of constituent i on calculation day t
- $cf_i(t1)$ is the cash flow due from constituent i at the next payment day $t1$.
- $ytm_i(t)$ is the yield to maturity of constituent i on calculation day t.
- f_i is the number of cash flows per year of constituent i.
- m is denote the number of payment periods until maturity. For perpetual securities the maturity date is set to rolling 100 years from the next cash flow date.
- v is the number of calendar days to next cash flow according the day count convention of constituent i.
- d is the number of calendar days between the previous cash flow and the next cash flow according the day count convention of constituent i.
- k is the time in cash flow periods.

7.2.11 Effective duration

$$effdur_i(t) = \frac{\left(p_{i,-1}(t) - p_{i,+1}(t)\right)}{\left(2 \times p_i(t) * 0.001\right)}$$

where,

- $EffDur_i(t)$ is the Effective duration of constituent i on calculation day (t).
- $p_i(t)$ is original dirty price of the security $\begin{cases} if\ quoted\ clean\ then\ closing\ price + accrued\ interest \\ if\ quoted\ dirty\ then\ closing\ price \end{cases}$ of constituent i on calculation day t
- $p_{i,-1}(t)$ is dirty price of the constituent i at (t) if the yield were to decrease by 1 basis point
- $p_{i,+1}(t)$ is dirty price of the constituent i at (t) if the yield were to increase by 1 basis point

Section 8

Announcing changes

8. Announcing changes

8.1 Changes to constituents

8.1.1 Index changes arising from the monthly review will be published four business days prior to the month end.

Appendix A

Further information

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

Glossary_of_terms.pdf (ftserussell.com)

Further information on the FTSE US Preferred Stock 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.lseg.com/en/ftse-russell/

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