

# Freedom Index Return Calculation Methodology

## 1.0 Introduction

**The Freedom Index aims to provide free, open and independent indexes for the asset management community.**

This document shows all the methodologies used to calculate returns for the Freedom Index.

The Freedom Index calculates returns in local currency and GBP and hedged into GBP return where appropriate. The Freedom Index also computes and distributes Corporate Action Factors (CAF). This document will outline the formula used for each CAF and how they are included when calculating returns.

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## 2.0 Local Returns

There are no securities automatically removed due to size or liquidity factors, if we receive data for a security, it will be used. A company's use in an index will be based upon the country of the exchange it trades on. All securities at a minimum will be included in the Freedom Index All-Share of its constituent country. Local return is the percentage change in price over the time period being measured, where prices are those given on the stock exchange the company is being traded on. This return doesn't include a currency return.

The return is calculated as follows:

$$r_{t-1 \rightarrow t} = \left( \left( \frac{P_t}{P_{t-1}} \right) - 1 \right) \times 100$$

Where:

$r_{t-1 \rightarrow t}$  = the return over period  $t - 1$  to  $t$ .

$P_t$  = the price of the security at time  $t$ .

$P_{t-1}$  = the price of the security at time  $t - 1$ .

### 2.1 Example

Company XYZ is being traded on a stock exchange. At time  $t - 1$ , it has a price of 23. At time  $t$ , the price of the security has changed to 24.2. Therefore the return over the period  $t - 1$  to  $t$  is 5.2%:

$$24.2 / 23 = 1.052$$

$$(1.052 - 1) \times 100 = 5.2\%$$

## 3.0 Returns in GBP

The return in GBP is calculated as the return in the local currency multiplied by any currency return, that is, the return gained on the changing exchange rates to GBP. The Freedom Index uses WM/Reuters exchange rates to calculate all the returns in GBP. For all UK securities, the return in GBP will be the same as the local return.

The formula is as follows:

$$(1 + r_L) \times (1 + r_C) - 1 = r$$

Where:

$r_L$  = return in local currency

$r_C$  = currency return

$r$  = return in GBP

### 3.1 Example

The local return of company XYZ has been calculated as 5.2% and the currency return of local to GBP is 1.3%. Therefore the return in GBP is 6.6%.

$$(1 + 0.052) \times (1 + 0.013) - 1 = 6.6\%$$

## 4.0 Hedged to GBP Return

When calculating our hedged to GBP return, we in effect "sell" 1 month forward notional contracts at the start of the measuring period and then calculate a return based on the gain or loss on those contracts. The hedged return is then calculated in a similar way to the return in section 3:

$$r_H = (1 + r_L) \times (1 + d) - 1 = r$$

Where:

$r_L$  = return in local currency

$d$  = interest rate differential (between relevant currencies)

$r_H$  = hedged return

Note for low interest rate currencies there will be a "benefit" of hedging and the hedged return will be greater than the local return and of course for high interest rate currencies there will be a "cost" of hedging.

### 4.1 Example

Company XYZ has a local return of 5.2% and the interest rate differential for the period is 0.3%. This leads to a hedged return of 4.9%.

$$(1 + 0.052) \times (1 + 0.003) - 1 = 0.049$$

## 5.0 Corporate Action Factors

When calculating returns, the Freedom Index has to take into consideration any Corporate Action Factors (CAF's) that may have affected the returns that were calculated.

### 5.1 Types of Corporate Actions and how they are dealt

There are many different types of corporate actions, the following table shows the CAF calculation method The Freedom Index assigns to each.

Corporate Action Type	CAF Calculation Method
Cash dividend (including bonuses, special dividends, return of capital, capital gain, extra, liquidation)	Cash dividends
Stock dividend with cash payment	Stock dividend and cash
Stock dividend or cash payment	Stock dividend or cash
Stock dividend	Stock dividend
Split	Split
Consolidation	Consolidation
Right offering	Rights issue
Spin-off	Spin-off
Issuer Bid	Buy Back
Par value change	Split/Consolidation
Capital reduction	Split/Consolidation
Capital repayment for equities	Cash dividends

The formula for each CAF calculation method can be found in Appendix A.

As can be seen some corporate actions, although different in implementation, are dealt with in the same way. For example, a split and a stock dividend are both dealt with by introducing a CAF equal to the shares at time t divided by the amount of shares at t-1 even though they are different actions.

If there is more than one corporate action on a single day, separate calculations will be made for each. The product of each action will then be used as the CAF for calculating the new return.

All CAFs are applied in the following way:

$$r_{t-1 \rightarrow t} = \prod_{t-1}^t CAF_t \times \left( \frac{P_t}{P_{t-1}} \right) - 1$$

Where:

$r_{t-1 \rightarrow t}$  = return over the period  $t - 1$  to  $t$ .

$CAF_t$  = Corporate Action Factor to be applied.

$P_t$  = the price of the security at time  $t$ .

$P_{t-1}$  = the price of the security at time  $t - 1$ .

If any material errors are found we will correct with immediate effect.

### 5.2 Handling of tax on cash dividends

In the UK the cash dividend is calculated as being "net" of tax and in the US it is calculated as "gross" of tax. This is due to the different countries' tax jurisdictions on cash dividends. In the UK "gross" stands for the actual cash dividend plus a tax credit that can only be claimed by a private (non-institutional) investor, whereas in other tax jurisdictions "gross" is the final payment that is received by an institutional investor.

Therefore using the cash dividend "net" of tax in the UK and "gross" in the US the returns produced will be those that an institutional investor would see if passively investing.

## 6.0 Appendix A – CAF Formulae

Corporate Action Type	CAF Formula
Cash dividend (including bonuses, special dividends, return of capital, capital gain, extra, liquidation)	$CAF_t^i = \frac{P_t^i + div_t^i}{P_t^i}$
Stock dividend with cash payment	$CAF_t^i = \frac{P_t^i + (Cash_t + P_t^i \times G_t^i)}{P_t^i}$
Stock dividend or cash payment	<p>If <math>G_t^i \times P_t^i &gt; Cash_t</math> then <math>CAF_t^i = \frac{N_t^i}{N_{t-1}^i}</math></p> <p>If <math>G_t^i \times P_t^i &lt; Cash_t</math> then <math>CAF_t^i = \frac{P_t^i + div_t^i}{P_t^i}</math></p>
Stock dividend	$CAF_t^i = \frac{N_t^i}{N_{t-1}^i}$
Split	$CAF_t^i = \frac{N_t^i}{N_{t-1}^i}$
Consolidation	$CAF_t^i = \frac{N_t^i}{N_{t-1}^i}$
Right offering	<p>If <math>pref P_t^i &lt; P_t^i</math> then</p> $CAF_t^i = \frac{[(P_t^i \times (N_{t-1}^i + I_t^i) - I_t^i \times pref P_t^i) / N_{t-1}^i]}{P_t^i}$ <p>Else <math>CAF_t^i = 1</math></p>
Spin-off	$CAF_t^i = \frac{P_t^i + (Cash_t + P_t^B \times G_t^B)}{P_t^i}$
Issuer Bid	$CAF_t^i = \frac{P_t^i - 1}{P_{t-1}^i - 1 \left[ \frac{P_{t-1}^i \times (N_t^i - N_{t-1}^i) + Cash_t^i \times N_{t-1}^i}{N_t^i} \right]}$
Par value change	$CAF_t^i = \frac{N_t^i}{N_{t-1}^i}$
Capital reduction	$CAF_t^i = \frac{N_t^i}{N_{t-1}^i}$
Capital repayment for equities	$CAF_t^i = \frac{P_t^i + Cash_t}{P_t^i}$