

FTSE Qualified Global Convertible Monthly Hedge Index Methodology

Revision 11 – FINAL



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Section 1

Introduction

1. Introduction

FTSE Convertible Indices are a family of Indices that aim to represent the performance of the global market of Convertible Bonds available to institutional investors. Defined terms used in this document have the meaning ascribed to them in Base Index unless otherwise defined.

This document describes the calculation process for the FTSE Qualified Global Convertible Monthly Hedged Index series. The series is calculated for a number of different currencies, within this document “Index” refers to a specific currency variant of the series and “Base Currency” refers to the currency of the Index.

The selection and weighting of the constituents of the Index are the same as for the FTSE Qualified Global Convertible Index (“Parent Index”), details of the methodology are contained in the [FTSE Qualified Global Convertible Index Methodology](#).

Defined terms used in this document have the meaning ascribed to them in Parent Index unless otherwise defined.

Section 2

Selection method

2. Selection method

2.1 Overview

The selection method for the index is the same as the selection method for the Parent Index. The relative weight of constituents is identical to the relative weights in the Parent Index.

The absolute weight of constituents will vary as the Index includes a monthly hedging process.

Section 3

Hedging Process

3. Hedging Process

3.1 General

The hedging process uses forward currency contracts to incorporate currency hedging into the calculation of Index value.

The hedging process follows a monthly cycle; the two key dates in the cycle are the Roll Date and Rebalance Date.

- The Roll Date is the working day prior to the Index Review Effective Date.
- The Rebalance Date is the Index Review Effective Date.

At EoD on the Roll Date all open forward contracts are closed, and the Base Currency cash is adjusted to reflect the crystallised P&L. New contracts are opened; the new contracts reflect the net position of contracts closed in each currency. The new contracts are referenced in this documentation as the “Roll Contracts”.

On the Rebalance Date new contracts are opened to provide the overall net exposure required in each currency based on the anticipated Index currency profile following the index review. The new contracts are referenced in this documentation as the “Rebalance Contracts”.

The Index value calculation incorporates the mark to market (MTM) valuation of all open forward positions.

The Hedge Ratio of the Index is monitored and if the Hedge Ratio exceeds 105% or falls below 95% then additional forward contracts will be incorporated into the calculation of the Index value. The new contracts are referenced in this documentation as the “Reset Contracts”.

3.2 Settlement Date

The Settlement Date used for each currency for the Roll Contracts is also used for the Rebalance Contracts executed on the day following the Roll Date and any Reset Contracts opened on any day from the Roll Date until the day before the following Roll Date.

The “Natural Settlement Date” is the second working day after the Rebalance Date. This date will be amended to reflect the settlement calendar of each currency pair using the following rules:

- If any of the 8 “Key Currencies” (USD, EUR, CHF, GBP, JPY, AUD, HKD, SGD) does not settle on the Natural Settlement Date then the Settlement Date is advanced for all currencies to the first available date on which all currencies can settle, this date is referenced as the “General Settlement Date”.
- If any currency does not settle on the General Settlement Date, then the Settlement Date for that currency only is advanced to the first available date on which that currency can settle.

3.3 Roll Contracts

The required exposure for the new Roll Contract for each currency is the sum of the delivery amounts for the open Roll Contract, the open Rebalance Contract and any open Reset Contracts.

3.4 Rebalance Contracts

The Required Exposure for each currency is calculated based on the information available at EoD on Roll Date.

The Required Exposure is calculated using the Index constituents and weights that will be effective following the securities rebalance that occurs at EoD on the Rebalance Date.

The Percentage Required Exposure for a specific currency is calculated as:

$$\text{Percentage Required Exposure} = \frac{\text{Anticipated market value of security positions priced in the specified currency}}{\text{Anticipated market value of Index}}$$

Where the anticipated market values are calculated using the bid price for each security as of close on Roll Date, the FX rates used for index calculation at close on Roll Date and the weighting that will be applied to the security following the securities rebalance.

The Required Exposure for a specific currency is:

$$\text{Required Exposure} = \text{Percentage Required Exposure} \times \text{Market Value of Index in CNY}$$

Where the market value of the index is the market value of the index at close on Roll Date converted to the specified currency using the FX rates used for index calculation on Roll Date.

The Rebalance Contract for each currency is the difference between the Roll Contract and the Required Exposure.

3.4.1 Treatment of CNH priced securities

The For CNH priced constituents the forward contracts are executed in CNY and the Required Exposure is calculated as follows:

$$\text{Percentage Required Exposure} = \frac{\text{Anticipated market value of security positions priced in CNH or CNY}}{\text{Anticipated market value of Index}}$$

$$\text{Required Exposure} = \text{Percentage Required Exposure} \times \text{Market Value of Index in CNY}$$

3.5 Reset Contracts

Reset Contracts are included if the Hedge Ratio is observed to be outside the specified limits (95% - 105%). The Hedge Ratio is calculated at each EoD and if outside the specified limits Reset Contracts are opened on the following Workday. If the Hedge Ratio is observed to be outside the specified limits when measured at EoD on the Roll Date then no Reset Contracts are opened on the following Workday as the Rebalance Contracts will reset the Hedge Ratio.

3.5.1 Hedge Ratio

Reset The Hedge Ratio is calculated at each EoD as

$$\text{Hedge Ratio} = \frac{\text{Value of Forwards} + \text{Value of Base Currency securities} + \text{Value of Base Currency cash}}{\text{Value of all Securities} + \text{Value of all Cash}}$$

Where the Value of Forwards is the sum of the net currency amount to deliver in each currency converted to Base Currency. All values are converted to the Base Currency using the FX rates used for calculation of the Index value at EoD.

The calculation of Hedge Ratio on the Rebalance Date uses the security positions and cash following the securities rebalance.

3.5.2 Adjustment Ratio

If the Hedge Ratio is outside the specified limits at EoD an Adjustment Value is calculated.

If the Hedge Ratio is greater than 105% then

$$\text{Adjustment Value} = \frac{(\text{Value of all Securities} + \text{Value of all Cash}) \times (103\% - \text{Hedge Ratio})}{\text{Value of Forwards}}$$

If the Hedge Ratio is less than 95% then

$$\text{Adjustment Value} = \frac{(\text{Value of all Securities} + \text{Value of all Cash}) \times (97\% - \text{Hedge Ratio})}{\text{Value of Forwards}}$$

3.5.3 Reset Contract Calculation

The Reset Contracts are applied on the Workday following the EoD at which the Hedge Ratio was observed to be outside the specified limits.

The value of the Reset Contract for a particular currency is:

$$\text{Reset contract delivery amount} = \text{Net delivery amount of all open contracts} \times \text{Adjustment Value}$$

3.6 Forward Contract Set Up Rates

Forward contracts are set up using the Interpolated Forward Rate for the relevant currency pair and Settlement Date.

Section 4.4.4 contains details of the calculation of the Interpolated Forward Rate.

Section 4

Calculation of Index

4. Calculation of Index

4.1 Overview of Calculation Approach

The calculation of the hedge Index uses the same approach as the Parent Index but incorporates the MTM valuation of the open forwards positions together with the crystallised P&L arising when the open positions are closed on Roll date.

4.2 Forward MTM Calculation

For each open contract, the MTM Valuation is calculated as:

$$MTM\ Valuation = Base\ Currency\ to\ receive - \left(\frac{Target\ Currency\ to\ deliver}{Interpolated\ Forward\ Rate} \right)$$

The Interpolated Forward Rate is for the period from the EoD date of the MTM calculation to the Settlement Date for the contract.

The Forward MTM P&L for the Index is the sum of the MTM valuations for all open contracts.

4.3 Crystallised P&L

On Roll Date all open contracts are closed and the crystallised value for each open contract is:

$$Crystallised\ Value = Base\ Currency\ to\ receive - \left(\frac{Target\ Currency\ to\ deliver}{Interpolated\ Forward\ Rate} \right)$$

The Interpolated Forward Rate is for the period from the Roll Date to the Settlement Date for the contract.

The Crystallised P&L for the index is the sum of the Crystallised Values for all open contracts.

4.4 Detail of Index Calculation

The index calculation will be carried out in the same manner as the index calculation of the Parent Index with the exception of the treatment of the forward MTM P&L and the Crystallised P&L, which are treated as set out in the sections below.

4.4.1 Daily Index Calculation

The daily index calculation is as shown below. In order to derive:

V^t The value of the index on day t . Index values are only computed for weekdays and if day t is a Friday then day $t + 1$ will be the following Monday

The values required are:

D_i^t The dirty cash value of one unit of the i^{th} issue in the index on day t .

B^t The combined value of all cash balances on day t , each held in the currency of receipt and converted to the index currency using the relevant Eod FX rate for index calculation. **This value includes the Crystallised P&L generated at EoD on Roll Date.**

M^t The Forward MTM P&L for the Index on day t .

S_i^t The issue size outstanding in units of the i^{th} issue in the index on day t

X_i^t The exchange rate used to convert the cash price of the i^{th} issue in the index on day t to the index currency.

F^t The index factor on day t

n^t The number of issues in the index on day t

The value of the index is given by:

$$V^t = \frac{B^t + M^t + \sum_{i=1}^{n^t} (D_i^t * S_i^t * X_i^t)}{F^t}$$

The value of F will remain unchanged except in any the following circumstances:

- A change to the constituents of the index that is not reflected solely as a change in the cash balances
- A change to the issue size of one or more of the constituents that is not reflected solely as a change in the cash balances
- The Index Review Effective Date when the cash balances are re-invested in the Index

The derivation of the new value for the index factor in each of these circumstances is shown below. Where:

new_B^t The combined value of all cash balances on day t , each held in the currency of receipt and converted to the index currency using the relevant Eod FX rate for index calculation. This value will be the same as B^t except in the case when cash balances are re-invested when new_B^t will be set to zero.

$new_S_i^t$ The issue size outstanding in units of the i^{th} issue in the index on day t following the change in circumstances for which the factor is to be adjusted.

new_F^t The index factor on day t following the change in circumstances for which the factor is to be adjusted.

new_n^t The number of issues in the index on day t following the change in circumstances for which the factor is to be adjusted.

The value of the index will be

$$\frac{new_B^t + M^t + \sum_{i=1}^{i=new_n^t} (D_i^t * new_S_i^t * X_i^t)}{new_F^t}$$

The value of the index is unchanged by the change in circumstances and therefore

$$V^t = \frac{B^t + M^t + \sum_{i=1}^{i=n^t} (D_i^t * S_i^t * X_i^t)}{F^t} = \frac{new_B^t + M^t + \sum_{i=1}^{i=new_n^t} (D_i^t * new_S_i^t * X_i^t)}{new_F^t}$$

And thus

$$new_F^t = \frac{new_B^t + M^t + \sum_{i=1}^{i=new_n^t} (D_i^t * new_S_i^t * X_i^t)}{B^t + M^t + \sum_{i=1}^{i=n^t} (D_i^t * S_i^t * X_i^t)}$$

4.4.2 Index Base Date

The Index Factor values at inception (11 April 2003) are set such that the Index Value on 10 September 2014 is 100 for all currency variants of the Index.

4.4.3 Forward Contract Adjustments

When the index factor is adjusted then all forward contracts are adjusted pro-rata to the change in index factor.

The impact of this adjustment is that the Percentage Required Exposure is maintained.

4.4.4 Forward Contract Adjustments

Interpolated forward rates are calculated using the relevant Spot Rate together with Premium/Discount (“Offset”) for Spot Week, One Month and Two Months (“Reference Rates”)

When the target Settlement Date does not fall on the settlement date for one of the Reference Rates the Offset is interpolated from the adjacent reference rates using linear interpolation.

4.4.5 Forward Rates Source

All Reference Rates are based on the WM/Reuters Closing Rate Fix (4pm London). The RICs used for each Reference Rate are listed in Appendix 1

The rates used for calculation of the Interpolated Forward Rates are mid rates which are calculated as the simple average of the Bid and Ask rates.

The settlement dates used for the Reference Rates are obtained as described in Appendix 2.

4.4.6 Forward Rates - Holidays

WM/Reuters do not provide data on certain holidays (notably Christmas Day and Good Friday).

The Index is calculated on all weekdays. In the event that Reference Rates are not available then the Index is calculated using the latest available Reference Rates and associated settlement dates.

4.5 Historical Index Data

4.5.1 Coverage

Index values for the period from 11 April 2003 to 7 February 2018 were calculated using historic data.

4.5.2 Historic Interpolated Forward Rates

4.5.2.1 USD, EUR and GBP Indexes

The Reference Rates used for the historic calculation for the period 11 April 2003 to 29 December 2017 were calculated using historic outright and spot rates from WM/Reuters.

The Reference Rates used for the historic calculation for the period 1 Jan 2018 to 7 February 2018 were taken from the historical data available for the RICs used for each Reference Rate as listed in Appendix 1

The settlement dates used for the reference rates was based on Refinitiv historic settlement diaries.

On dates for which Reference Rates were not available the Index was calculated using the Reference Rates and settlement dates used for the prior day's calculation.

4.5.2.2 CHF Index

The Reference Rates used for the historic calculation for the period 11 April 2003 to 27 November 2012 were calculated using historic spot rates and offset rates obtained for the RICs as listed in Appendix 1 Section 5.5

The Reference Rates used for the historic calculation for the period 28 November 2012 onwards were calculated from the historical data available for the RICs used for each Reference Rate as listed in Appendix 1 for HKD and TWD only, for the period 28 Oct 2013 – 12 Nov 2013, the Reference Rates used were calculated using the method described for the period prior to 28 November 2012.

The settlement dates used for the reference rates was based on Refinitiv historic settlement diaries.

On dates for which Reference Rates were not available the Index was calculated using the Reference Rates and settlement dates used for the prior day's calculation.

4.5.3 Historic Settlement Dates

For the period 11 April 2003 to 31 December 2007 the Settlement Date was based on notional settlement diaries for USD, GBP and EUR only.

For the period from 1 January 2008 to 7 February 2018 the Settlement Date was based on Refinitiv historic settlement diaries for all currencies.

Section 5

Appendix 1

5.1 Sources used for Reference Rates – USD Hedged Index

Index Currency	Target Currency	Spot	Spot Week Offset	One Month Offset	Two months Offset	Notes
USD	EUR	USDEURFIX=WM	USDEURSWFIX=WM	USDEUR1MFX=WM	USDEUR2MFX=WM	Inverted
USD	GBP	USDGBPFX=WM	USDGBPSWFIX=WM	USDGBP1MFX=WM	USDGBP2MFX=WM	Inverted
USD	CHF	USDCHFFIX=WM	USDCHFSWFIX=WM	USDCHF1MFX=WM	USDCHF2MFX=WM	
USD	AUD	USDAUDFIX=WM	USDAUDSWFIX=WM	USDAUD1MFX=WM	USDAUD2MFX=WM	Inverted
USD	CAD	USDCADFIX=WM	USDCADSWFIX=WM	USDCAD1MFX=WM	USDCAD2MFX=WM	
USD	CNY	USDCNYFIX=WM	USDCNYSWFIX=WM	USDCNY1MFX=WM	USDCNY2MFX=WM	
USD	HKD	USDHKDFIX=WM	USDHKDSWFIX=WM	USDHKD1MFX=WM	USDHKD2MFX=WM	
USD	JPY	USDJPYFIX=WM	USDJPYSWFIX=WM	USDJPY1MFX=WM	USDJPY2MFX=WM	
USD	KRW	USDKRWFIX=WM	USDKRWSWFIX=WM	USDKRW1MFX=WM	USDKRW2MFX=WM	
USD	SEK	USDSEKFIX=WM	USDSEKSWFIX=WM	USDSEK1MFX=WM	USDSEK2MFX=WM	
USD	SGD	USDSGDFIX=WM	USDSGDSWFIX=WM	USDSGD1MFX=WM	USDSGD2MFX=WM	
USD	THB	USDTHBFIX=WM	USDTHBSWFIX=WM	USDTHB1MFX=WM	USDTHB2MFX=WM	
USD	TWD	USDTWDFIX=WM	USDTWDSWFIX=WM	USDTWD1MFX=WM	USDTWD2MFX=WM	
USD	ZAR	USDZARFIX=WM	USDZARSWFIX=WM	USDZAR1MFX=WM	USDZAR2MFX=WM	

The rates marked “Inverted” in the notes column are inverted as described below before being used in the Index Calculation.

$$\text{Spot Bid used} = 1/\text{Spot Offer from RIC}$$

$$\text{Spot Offer used} = 1/\text{Spot Bid from RIC}$$

$$\text{Tenor Bid Offset used} = (1/[\text{Spot Offer from RIC} + \text{Tenor Offer Offset from RIC}]) - \text{Spot Bid used}$$

$$\text{Tenor Offer Offset used} = (1/[\text{Spot Bid from RIC} + \text{Tenor Bid Offset from RIC}]) - \text{Spot Offer used}$$

Where Tenor is Spot Week, One Month or Two Months

Example, calculating GBP 2M Bid Offset

$$\text{GBP 2M Bid Offset}$$

$$= (1/[\text{USDGBPFX=WM Offer} + \text{USDGBP2MFX=WM Offer}]) - (1/\text{USDGBPFX=WM Offer})$$

5.2 Sources used for Reference Rates – EUR Hedged Index

Index Currency	Target Currency	Spot	Spot Week Offset	One Month Offset	Two months Offset
EUR	USD	EURUSDFIX=WM	EURUSD5WFIX=WM	EURUSD1MFIX=WM	EURUSD2MFIX=WM
EUR	GBP	EURGBPFIX=WM	EURGBPSWFIX=WM	EURGBP1MFIX=WM	EURGBP2MFIX=WM
EUR	CHF	EURCHFFIX=WM	EURCHF5WFIX=WM	EURCHF1MFIX=WM	EURCHF2MFIX=WM
EUR	AUD	EURAUDFIX=WM	EURAUD5WFIX=WM	EURAUD1MFIX=WM	EURAUD2MFIX=WM
EUR	CAD	EURCADFIX=WM	EURCAD5WFIX=WM	EURCAD1MFIX=WM	EURCAD2MFIX=WM
EUR	CNY	EURCNFIX=WM	EURCN5WFIX=WM	EURCN1MFIX=WM	EURCN2MFIX=WM
EUR	HKD	EURHKDFIX=WM	EURHKDSWFIX=WM	EURHKD1MFIX=WM	EURHKD2MFIX=WM
EUR	JPY	EURJPYFIX=WM	EURJPYSWFIX=WM	EURJPY1MFIX=WM	EURJPY2MFIX=WM
EUR	KRW	EURKRWFIX=WM	EURKRWSWFIX=WM	EURKRW1MFIX=WM	EURKRW2MFIX=WM
EUR	SEK	EURSEKFIX=WM	EURSEKSWFIX=WM	EURSEK1MFIX=WM	EURSEK2MFIX=WM
EUR	SGD	EURSGDFIX=WM	EURSGDSWFIX=WM	EURSGD1MFIX=WM	EURSGD2MFIX=WM
EUR	THB	EURTHBFIX=WM	EURTHBSWFIX=WM	EURTHB1MFIX=WM	EURTHB2MFIX=WM
EUR	TWD	EURTWDFIX=WM	EURTWDSWFIX=WM	EURTWD1MFIX=WM	EURTWD2MFIX=WM
EUR	ZAR	EURZARFIX=WM	EURZARSWFIX=WM	EURZAR1MFIX=WM	EURZAR2MFIX=WM

5.3 Sources used for Reference Rates – GBP Hedged Index

GBP Hedged Index

Index Currency	Target Currency	Spot	Spot Week Offset	One Month Offset	Two months Offset
GBP	USD	GBPUSDFIX=WM	GBPUSD5WFIX=WM	GBPUSD1MFIX=WM	GBPUSD2MFIX=WM
GBP	EUR	GBPEURFIX=WM	GBPEURSWFIX=WM	GBPEUR1MFIX=WM	GBPEUR2MFIX=WM
GBP	CHF	GBPCHFFIX=WM	GBPCHF5WFIX=WM	GBPCHF1MFIX=WM	GBPCHF2MFIX=WM
GBP	AUD	GBPAUDFIX=WM	GBPAUD5WFIX=WM	GBPAUD1MFIX=WM	GBPAUD2MFIX=WM
GBP	CAD	GBPCADFIX=WM	GBPCAD5WFIX=WM	GBPCAD1MFIX=WM	GBPCAD2MFIX=WM
GBP	CNY	GBPCNFIX=WM	GBPCN5WFIX=WM	GBPCN1MFIX=WM	GBPCN2MFIX=WM
GBP	HKD	GBPHKDFIX=WM	GBPHKDSWFIX=WM	GBPHKD1MFIX=WM	GBPHKD2MFIX=WM
GBP	JPY	GBPJPYFIX=WM	GBPJPYSWFIX=WM	GBPJPY1MFIX=WM	GBPJPY2MFIX=WM
GBP	KRW	GBPKRWFIX=WM	GBPKRWSWFIX=WM	GBPKRW1MFIX=WM	GBPKRW2MFIX=WM
GBP	SEK	GBPSEKFIX=WM	GBPSEKSWFIX=WM	GBPSEK1MFIX=WM	GBPSEK2MFIX=WM
GBP	SGD	GBPSGDFIX=WM	GBPSGDSWFIX=WM	GBPSGD1MFIX=WM	GBPSGD2MFIX=WM
GBP	THB	GBPTHBFIX=WM	GBPTHBSWFIX=WM	GBPTHB1MFIX=WM	GBPTHB2MFIX=WM
GBP	TWD	GBPTWDFIX=WM	GBPTWDSWFIX=WM	GBPTWD1MFIX=WM	GBPTWD2MFIX=WM
GBP	ZAR	GBPZARFIX=WM	GBPZARSWFIX=WM	GBPZAR1MFIX=WM	GBPZAR2MFIX=WM

5.4 Sources used for Reference Rates – CHF Hedged Index

Index Currency	Target Currency	Spot	Spot Week Offset	One Month Offset	Two months Offset	Calculation Method
CHF	AUD	CHFAUDFIX=WM	USDAUDSWOR=WM	USDAUD1MOR=WM	USDAUD2MOR=WM	Invert & Cross
CHF	EUR	CHFEURFIX=WM	EURCHFWSOR=WM	EURCHF1MOR=WM	EURCHF2MOR=WM	Invert Outright
CHF	USD	CHFUSDFIX=WM	USDCHFWSOR=WM	USDCHF1MOR=WM	USDCHF2MOR=WM	Invert Outright
CHF	GBP	CHFGBPFIX=WM	GBPCHFWSOR=WM	GBPCHF1MOR=WM	GBPCHF2MOR=WM	Invert Outright
CHF	CAD	CHFCADFIX=WM	USDCADSWOR=WM	USDCAD1MOR=WM	USDCAD2MOR=WM	Cross
CHF	CNY	CHFCNYFIX=WM	USDCNYSWOR=WM	USDCNY1MOR=WM	USDCNY2MOR=WM	Cross
CHF	HKD	CHFHKDFIX=WM	USDHKDSWOR=WM	USDHKD1MOR=WM	USDHKD2MOR=WM	Cross
CHF	JPY	CHFJPYFIX=WM	USDJPYSWOR=WM	USDJPY1MOR=WM	USDJPY2MOR=WM	Cross
CHF	KRW	CHFKRWFIX=WM	USDKRWSWOR=WM	USDKRW1MOR=WM	USDKRW2MOR=WM	Cross
CHF	SEK	CHFSEKFIX=WM	USDSEKSWOR=WM	USDSEK1MOR=WM	USDSEK2MOR=WM	Cross
CHF	SGD	CHFSGDFIX=WM	USDSGDSWOR=WM	USDSGD1MOR=WM	USDSGD2MOR=WM	Cross
CHF	THB	CHFTHBFIX=WM	USDTHBSWOR=WM	USDTHB1MOR=WM	USDTHB2MOR=WM	Cross
CHF	TWD	CHFTWDFIX=WM	USDTWDSWOR=WM	USDTWD1MOR=WM	USDTWD2MOR=WM	Cross
CHF	ZAR	CHFZARFIX=WM	USDZARSWOR=WM	USDZAR1MOR=WM	USDZAR2MOR=WM	Cross
CHF Cross Rate			USDCHFWSOR=WM	USDCHF1MOR=WM	USDCHF2MOR=WM	

The rates in the Offset columns above are outright rates which are processed as described below to generate the Offsets which are used in the Index Calculation.

The rates marked “**Invert Outright**” in the Calculation Method column are inverted as described below before being used in the Index Calculation.

$$\text{Tenor Bid Offset} = (1/\text{Tenor Outright Offer}) - \text{Spot Bid}$$

$$\text{Tenor Offer Offset} = (1/\text{Tenor Outright Bid}) - \text{Spot Offer}$$

Where Tenor is Spot Week, One Month or Two Months

Example, calculating GBP 2M Bid Offset

$$\text{GBP 2M Bid Offset} = (1/\text{GBPCHF2MOR=WM Offer}) - \text{CHFGBPFIX=WM Bid}$$

The rates marked “**Cross**” in the calculation are crossed as described below before being used in the Index Calculation.

$$\text{Tenor Bid Offset} = (\text{Tenor Outright Bid}/\text{Tenor CHF Cross Rate Offer}) - \text{Spot Bid}$$

$$\text{Tenor Offer Offset} = (\text{Tenor Outright Offer}/\text{Tenor CHF Cross Rate Bid}) - \text{Spot Offer}$$

Where Tenor is Spot Week, One Month or Two Months

Example, calculating HKD 2M Bid Offset

$$\text{HKD 2M Bid Offset} = (\text{USDHKD2MOR=WM Bid}/\text{USDCHF2MOR=WM Offer}) - \text{CHFHKDFIX=WM Bid}$$

The rates marked “**Invert & Cross**” in the calculation are crossed as described below before being used in the Index Calculation.

$$\text{Tenor Bid Offset} = ([1/\text{Tenor Outright Offer}]/\text{Tenor CHF Cross Rate Offer}) - \text{Spot Bid}$$

$$\text{Tenor Offer Offset} = ([1/\text{Tenor Outright Bid}]/\text{Tenor CHF Cross Rate Bid}) - \text{Spot Offer}$$

Where Tenor is Spot Week, One Month or Two Months

Example, calculating AUD 2M Bid Offset

$$\begin{aligned} \text{AUD 2M Bid Offset} \\ = ([1/\text{USDAUD2MOR=WM Offer}]/\text{USDCHF2MOR=WM Offer}) - \text{CHFAUDFIX=WM Bid} \end{aligned}$$

5.5 Sources used for HISTORIC Reference Rates – CHF Hedged Index

For dates prior to 28 Nov 2012 the reference rates were calculated using the sources and calculations below. In addition, for HKD and TWD only, these sources were used for the period 28 Oct 2013 – 12 Nov 2013 inclusive.

Index Currency	Target Currency	Spot	Spot Week Offset	One Month Offset	Two months Offset	Calculation Method
CHF	AUD	USDAUDFIX=WM	USDAUDSWFIX=WM	USDAUD1MFIX=WM	USDAUD2MFIX=WM	Invert & Cross
CHF	EUR	EURCHFFIX=WM	EURCHFSWFIX=WM	EURCHF1MFIX=WM	EURCHF2MFIX=WM	Invert
CHF	USD	USDCHFFIX=WM	USDCHFSWFIX=WM	USDCHF1MFIX=WM	USDCHF2MFIX=WM	Invert
CHF	GBP	GBPCHFFIX=WM	GBPCHFSWFIX=WM	GBPCHF1MFIX=WM	GBPCHF2MFIX=WM	Invert
CHF	CAD	USDCADFIX=WM	USDCADSWFIX=WM	USDCAD1MFIX=WM	USDCAD2MFIX=WM	Cross
CHF	CNY	USDCNYFIX=WM	USDCNYSWFIX=WM	USDCNY1MFIX=WM	USDCNY2MFIX=WM	Cross
CHF	HKD	USDHKDFIX=WM	USDHKDSWFIX=WM	USDHKD1MFIX=WM	USDHKD2MFIX=WM	Cross
CHF	JPY	USDJPYFIX=WM	USDJPYSWFIX=WM	USDJPY1MFIX=WM	USDJPY2MFIX=WM	Cross
CHF	KRW	USDKRWFIX=WM	USDKRWSWFIX=WM	USDKRW1MFIX=WM	USDKRW2MFIX=WM	Cross
CHF	SEK	USDSEKFIX=WM	USDSEKSWFIX=WM	USDSEK1MFIX=WM	USDSEK2MFIX=WM	Cross
CHF	SGD	USDSGDFIX=WM	USDSGDSWFIX=WM	USDSGD1MFIX=WM	USDSGD2MFIX=WM	Cross
CHF	THB	USDTHBFIX=WM	USDTHBSWFIX=WM	USDTHB1MFIX=WM	USDTHB2MFIX=WM	Cross
CHF	TWD	USDTWDFIX=WM	USDTWDSWFIX=WM	USDTWD1MFIX=WM	USDTWD2MFIX=WM	Cross
CHF	ZAR	USDZARFIX=WM	USDZARSWFIX=WM	USDZAR1MFIX=WM	USDZAR2MFIX=WM	Cross
CHF Cross Rate		USDCHFFIX=WM	USDCHFSWFIX=WM	USDCHF1MFIX=WM	USDCHF2MFIX=WM	

The rates in the columns are processed as described below to generate the Offsets which are used in the Index Calculation.

The rates marked “**Invert**” in the Calculation Method column are inverted as described below before being used in the Index Calculation.

$$\text{Spot Bid used} = 1/\text{Spot Offer from RIC}$$

$$\text{Spot Offer used} = 1/\text{Spot Bid from RIC}$$

$$\text{Tenor Bid Offset used} = (1/[\text{Spot Offer from RIC} + \text{Tenor Offer Offset from RIC}]) - \text{Spot Bid used}$$

$$\text{Tenor Offer Offset used} = (1/[\text{Spot Bid from RIC} + \text{Tenor Bid Offset from RIC}]) - \text{Spot Offer used}$$

Where Tenor is Spot Week, One Month or Two Months

Example, calculating GBP 2M Bid Offset

$$\begin{aligned} \text{GBP 2M Bid Offset} &= (1/[\text{GBPCHFFIX=WM Offer} + \text{BPCHF2MFX=WM Offer}]) - (1/\text{GBPCHFFIX=WM Offer}) \end{aligned}$$

The rates marked “**Cross**” in the calculation are crossed as described below before being used in the Index Calculation.

$$\text{Spot Bid used} = \text{Spot Bid from RIC/Spot Offer from CHF Cross Rate RIC}$$

$$\text{Spot Offer used} = \text{Spot Offer from RIC/Spot Bid from CHF Cross Rate RIC}$$

$$\text{Tenor Bid Offset used}$$

$$= \frac{\text{Spot Bid from RIC} + \text{Tenor Bid Offset from RIC}}{\text{Spot Offer from CHF Cross Rate RIC} + \text{Tenor Offer Offset from CHF Cross Rate RIC}} - \text{Spot Bid used}$$

$$\text{Tenor Offer Offset used}$$

$$= \frac{\text{Spot Offer from RIC} + \text{Tenor Offer Offset from RIC}}{\text{Spot Bid from CHF Cross Rate RIC} + \text{Tenor Bid Offset from CHF Cross Rate RIC}} - \text{Spot Offer used}$$

Where Tenor is Spot Week, One Month or Two Months Example, calculating HKD 2M Bid Offset

$$\text{HKD 2M Bid Offset} = \frac{\text{USDHKDFIX=WM Bid} + \text{USDHKD2MFX=WM Bid}}{\text{USDCHFFIX=WM Offer} + \text{USDCHF2MFX=WM Offer}} - \frac{\text{USDHKDFIX=WM Bid}}{\text{USDCHFFIX=WM Offer}}$$

The rates marked “**Invert & Cross**” in the calculation are crossed as described below before being used in the Index Calculation

$$\text{Spot Bid used} = \text{Spot Bid from RIC/Spot Offer from CHF Cross Rate RIC}$$

$$\text{Spot Offer used} = \text{Spot Offer from RIC/Spot Bid from CHF Cross Rate RIC}$$

$$\text{Tenor Bid Offset used} = \frac{\text{Spot Bid from RIC} + \text{Tenor Bid Offset from RIC}}{\text{Spot Offer from CHF Cross Rate RIC} + \text{Tenor Offer Offset from CHF Cross Rate RIC}} - \text{Spot Bid used}$$

$$\text{Tenor Offer Offset used} = \frac{\text{Spot Offer from RIC} + \text{Tenor Offer Offset from RIC}}{\text{Spot Bid from CHF Cross Rate RIC} + \text{Tenor Bid Offset from CHF Cross Rate RIC}} - \text{Spot Offer used}$$

Where Tenor is Spot Week, One Month or Two Months Example, calculating AUD 2M Bid Offset

$$\text{AUD 2M Bid Offset} = \frac{(1/[\text{USDAUDFIX=WM Offer} + \text{USDAUD2MFX=WM Offer}])}{(\text{USDCHFFIX=WM Offer} + \text{USDCHF2MFX=WM Offer})} - \frac{(1/\text{USDAUDFIX=WM Offer})}{\text{USDCHFFIX=WM Offer}}$$

Section 6

Appendix 2

6.1 Sources used for settlement dates for Reference Rates – USD Hedged index

Index Currency	Target Currency	Spot	Spot Week	One Month	Two months
USD	EUR	USDEURSW=R	USDEURSW=R	USDEUR1M=R	USDEUR2M=R
USD	GBP	USDGBPSW=R	USDGBPSW=R	USDGBP1M=R	USDGBP2M=R
USD	CHF	CHFUSDSW=R	CHFUSDSW=R	CHFUSD1M=R	CHFUSD2M=R
USD	AUD	USDAUDSW=R	USDAUDSW=R	USDAUD1M=R	USDAUD2M=R
USD	CAD	CADUSDSW=R	CADUSDSW=R	CADUSD1M=R	CADUSD2M=R
USD	CNY	CNYUSDSW=R	CNYUSDSW=R	CNYUSD1M=R	CNYUSD2M=R
USD	HKD	HKDUSDSW=R	HKDUSDSW=R	HKDUSD1M=R	HKDUSD2M=R
USD	JPY	JPYUSDSW=R	JPYUSDSW=R	JPYUSD1M=R	JPYUSD2M=R
USD	KRW	KRWUSDSW=R	KRWUSDSW=R	KRWUSD1M=R	KRWUSD2M=R
USD	SEK	SEKUSDSW=R	SEKUSDSW=R	SEKUSD1M=R	SEKUSD2M=R
USD	SGD	SGDUSDSW=R	SGDUSDSW=R	SGDUSD1M=R	SGDUSD2M=R
USD	THB	THBUSDSW=R	THBUSDSW=R	THBUSD1M=R	THBUSD2M=R
USD	TWD	TWDUSDSW=R	TWDUSDSW=R	TWDUSD1M=R	TWDUSD2M=R
USD	ZAR	ZARUSDSW=R	ZARUSDSW=R	ZARUSD1M=R	ZARUSD2M=R

The settlement date for Spot rates use the start date information from the RIC, the settlement date for the forward rates is taken from the maturity date information from the RIC.

6.2 Sources used for settlement dates for Reference Rates – EUR Hedged index

Index Currency	Target Currency	Spot	Spot Week	One Month	Two months
EUR	USD	USDEURSW=R	USDEURSW=R	USDEUR1M=R	USDEUR2M=R
EUR	GBP	EURGBPSW=R	EURGBPSW=R	EURGBP1M=R	EURGBP2M=R
EUR	CHF	EURCHFSW=R	EURCHFSW=R	EURCHF1M=R	EURCHF2M=R
EUR	AUD	EURAUDSW=R	EURAUDSW=R	EURAUD1M=R	EURAUD2M=R
EUR	CAD	EURCADSW=R	EURCADSW=R	EURCAD1M=R	EURCAD2M=R
EUR	CNY	EURCNYSW=R	EURCNYSW=R	EURCNY1M=R	EURCNY2M=R
EUR	HKD	EURHKDSW=R	EURHKDSW=R	EURHKD1M=R	EURHKD2M=R
EUR	JPY	EURJPYSW=R	EURJPYSW=R	EURJPY1M=R	EURJPY2M=R
EUR	KRW	EURKRWSW=R	EURKRWSW=R	EURKRW1M=R	EURKRW2M=R
EUR	SEK	EURSEKSW=R	EURSEKSW=R	EURSEK1M=R	EURSEK2M=R
EUR	SGD	EURSGDSW=R	EURSGDSW=R	EURSGD1M=R	EURSGD2M=R
EUR	THB	EURTHBSW=R	EURTHBSW=R	EURTHB1M=R	EURTHB2M=R
EUR	TWD	EURTWDSW=R	EURTWDSW=R	EURTWD1M=R	EURTWD2M=R
EUR	ZAR	EURZARSW=R	EURZARSW=R	EURZAR1M=R	EURZAR2M=R

The settlement date for Spot rates use the start date information from the RIC, the settlement date for the forward rates is taken from the maturity date information from the RIC.

6.3 Sources used for settlement dates for Reference Rates – GBP Hedged index

Index Currency	Target Currency	Spot	Spot Week	One Month	Two months
GBP	USD	USDGBPSW=R	USDGBPSW=R	USDGBP1M=R	USDGBP2M=R
GBP	EUR	GBPEURSW=R	GBPEURSW=R	GBPEUR1M=R	GBPEUR2M=R
GBP	CHF	GBPCHFSW=R	GBPCHFSW=R	GBPCHF1M=R	GBPCHF2M=R
GBP	AUD	GBPAUDSW=R	GBPAUDSW=R	GBPAUD1M=R	GBPAUD2M=R
GBP	CAD	GBPCADSW=R	GBPCADSW=R	GBPCAD1M=R	GBPCAD2M=R
GBP	CNY	GBPCNYSW=R	GBPCNYSW=R	GBPCNY1M=R	GBPCNY2M=R
GBP	HKD	GBPHKDSW=R	GBPHKDSW=R	GBPHKD1M=R	GBPHKD2M=R
GBP	JPY	GBPJPYSW=R	GBPJPYSW=R	GBPJPY1M=R	GBPJPY2M=R
GBP	KRW	GBPKRWSW=R	GBPKRWSW=R	GBPKRW1M=R	GBPKRW2M=R
GBP	SEK	GBPSEKSW=R	GBPSEKSW=R	GBPSEK1M=R	GBPSEK2M=R
GBP	SGD	GBPSGDSW=R	GBPSGDSW=R	GBPSGD1M=R	GBPSGD2M=R
GBP	THB	GBPTHBSW=R	GBPTHBSW=R	GBPTHB1M=R	GBPTHB2M=R
GBP	TWD	GBPTWDSW=R	GBPTWDSW=R	GBPTWD1M=R	GBPTWD2M=R
GBP	ZAR	GBPZARSW=R	GBPZARSW=R	GBPZAR1M=R	GBPZAR2M=R

The settlement date for Spot rates use the start date information from the RIC, the settlement date for the forward rates is taken from the maturity date information from the RIC.

6.4 Sources used for settlement dates for Reference Rates – CHF Hedged index

Index Currency	Target Currency	Spot	Spot Week	One Month	Two months
CHF	USD	CHFUSDSW=R	CHFUSDSW=R	CHFUSD1M=R	CHFUSD2M=R
CHF	EUR	CHFEURSW=R	CHFEURSW=R	CHFEUR1M=R	CHFEUR2M=R
CHF	GBP	CHFGBPSW=R	CHFGBPSW=R	CHFGBP1M=R	CHFGBP2M=R
CHF	AUD	CHFAUDSW=R	CHFAUDSW=R	CHFAUD1M=R	CHFAUD2M=R
CHF	CAD	CHFCADSW=R	CHFCADSW=R	CHFCAD1M=R	CHFCAD2M=R
CHF	CNY	CHFCNYSW=R	CHFCNYSW=R	CHFCNY1M=R	CHFCNY1M=R
CHF	HKD	CHFHKDSW=R	CHFHKDSW=R	CHFHKD1M=R	CHFHKD2M=R
CHF	JPY	CHFJPYSW=R	CHFJPYSW=R	CHFJPY1M=R	CHFJPY2M=R
CHF	KRW	CHFKRWSW=R	CHFKRWSW=R	CHFKRW1M=R	CHFKRW2M=R
CHF	SEK	CHFSEKSW=R	CHFSEKSW=R	CHFSEK1M=R	CHFSEK2M=R
CHF	SGD	CHFSGDSW=R	CHFSGDSW=R	CHFSGD1M=R	CHFSGD2M=R
CHF	THB	CHFTHBSW=R	CHFTHBSW=R	CHFTHB1M=R	CHFTHB2M=R
CHF	TWD	CHFTWDSW=R	CHFTWDSW=R	CHFTWD1M=R	CHFTWD2M=R
CHF	ZAR	CHFZARSW=R	CHFZARSW=R	CHFZAR1M=R	CHFZAR2M=R

The settlement date for Spot rates use the start date information from the RIC, the settlement date for the forward rates is taken from the maturity date information from the RIC.

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