



NCFX-BI family Benchmark Definition and Statement

The following provides a basic definition of the NCFX-BI family of benchmarks:

- The NCFX-BI is a family of benchmarks produced by New Change FX to measure the performance of individual currencies against the major trade currencies (USD, EUR and GBP). The benchmarks capture the natural return obtained by investing in assets denominated in a local currency.
- Deviations from a simple, short base, long local currency allocation (i.e. less or more than a 100% hedge ratio) represent an active currency decision. Currency beta is the systematic return available from purchasing currency exposure in a given currency pair.
- NCFX Benchmarks provide investors and managers with an index tool that measures this systematic return.
- New Change FX has created an index for 21 individual currencies against base (USD, EUR or GBP), calculated from the underlying NCFX Mid-Rate benchmarks (NCFX-MI) in spot and forwards.
- Input data is derived automatically from the FX market places/ECNs connected to NCFX.
- Input data is collected at 4 pm local time in London, capturing the prevailing market clearing rate from the underlying executable best bid and offer rates available in spot and forwards markets at that time.
- Each member of the underlying NCFX-MI family of benchmarks requires a minimum of two independent contributing marketplaces/ECNs to be accepted for use in calculation of the NCFX beta indices benchmarks
- Where for whatever reason, at least two independent market places are not able to furnish a rate, NCFX will not publish the underlying NCFX MI benchmark. This will mean that the NCFX BI benchmark for the related currency pair will not be available either. In the absence of the underlying data, the NCFX BI benchmark would not be available to users, for valuation purposes, until such time as normal conditions resume and at least two independent market places are able to resume publication of prices in real-time.
- All input data feeds are from the top of the contributor's books for 1 million units of the base currency.
- Contributions must be relevant, timely and fully automated. No data is accepted from manual submissions.
- Discretion is neither permitted nor possible in the creation of the NCFX BI benchmarks.
- This methodology has been adopted in order to deliver a correct, calculated value for maintaining an open position in local currency through the use of currency forwards, without any manual intervention in the calculation of the value of the position, or the presence of ex-post trade information in the benchmark.
- The reason for delivering an independent index is to provide clients with access to a measure that has not been and cannot be affected directly by their own transactions.
- NCFX does not offer NCFX-BI benchmarks in currency pairs that exhibit limitations in terms of contributing feeds.
- In the event of adverse change of circumstances for a given member of a family of benchmarks, clients would be notified, and the benchmark withdrawn until such time as the underlying NCFX-MI data became available again.



- Given the fully automated nature of the index and its calculation, we have not knowingly had an error in the calculation of the index, over the more than 2 years for which the index values are available. If an error were identified, we would check the inputs that created the error and check the nature of the error. If the error were deemed to indeed be an error, for example one of the underlying inputs being quoted to the wrong decimal place, the error would be corrected, and the value of the index revised.
- The notional amount of each index is expressed in units of the index base. For the USD family of indices, the USD is the base currency. For the EUR family of indices, EUR is the base currency, and so on.
- The starting value of each NCFX-BI index is 100 units of the base currency as of 29th December 2017
- The indices are arranged as families. The dollar index family represents a short position in the USD, long position in one of 21 currency pairs. For a long currency, short index currency position (e.g. short USDCHF), we identify whether the currency pair is quoted in USD or currency terms.
- When the currency pair is quoted in USD terms, i.e. AUDUSD where the notional amount would normally refer to AUD, we adjust AUD and convert to USD base using the opening forward rate - the last business day of each month when a new 1-month forward position is opened. AUD terms = $100/FP_0 = \$100$ equivalent
- At the end of each month, where the currency pair is quoted in currency terms (non-index base), we sell base currency. We identify the opening forward price and subtract the closing spot price.
 - For a SELL, $Term\ pips = FP_0 - S_1$
 - Where FP_0 is the opening Forward
 - S_1 is the closing Spot
- Where currency pair is quoted in USD terms, i.e. AUDUSD, we buy the base currency and sell the term currency. Pips gain or loss is calculated are calculated:
 - For a BUY, $Term\ pips = S_1 - FP_0$
 - Which we convert into USD base $Term\ pips/S_1 = Pips\ in\ USD\ (index\ base\ currency)$
 - Which we convert into a % return
 - $1 + (pips\ in\ USD/100)$
- At each month end, we multiply the month opening value of the index by the % return
- For Daily pricing we accrue the implied yield and change in spot by capturing the return from buying back the USD forward with the same month end value date
- $daily\ return\ k, T = \left\{ \frac{F1\ k, T-t}{FP} - 1 \right\}$
 - Where $F1\ k, T-t$ is the forward outright at time t with the $T-t$ days maturity and the value date is identical to the value date of the opening 1 month Forward FP .
- The daily value of the index is calculated as the opening value of the current month multiplied by $1 +$ daily return.
- On the last day of the current month, the value of the index on the last day is calculated as the $1 +$ monthly return, and a new 1month forward position is recorded.