



# **ICE U.S. DOLLAR INFLATION INDEX FAMILY**

## **CALCULATION METHODOLOGY - FEEDBACK PERIOD**

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# Preface

## Document Purpose

Initial calculation methodology for proposed ICE U.S. Dollar Inflation Index Family - Feedback Period

## Document History

VERSION NO.	DATE	CHANGE DESCRIPTION
v1.0	8 March 2022	Initial version

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# 1. OVERVIEW

## 1.1 BACKGROUND

IBA is proposing to publish a set of U.S. Dollar Inflation Indices, based on relevant US Treasury and Swap instruments. The intention is to have a broader base for the calculation than just one instrument class, with a view to potentially launching a benchmark if market feedback is positive.

The Indices will consist of three annualized market implied expected inflation rates, each published daily:

- **1 Year inflation (“INFL 1Y”)**
- **5 Year inflation, 1 Year forward (“FWD INFL 1x5Y”)**
- **5 Year inflation, 5 Years forward (“FWD INFL 5x5Y”)**

## 1.2 CALCULATION INPUTS

The input data will be:

- US Treasury TIPS and US Treasury bills, notes and bonds with like maturities. Taken together, a forecast inflation rate for the maturity can be implied.
  - Data for each instrument includes maturity date, coupon, and daily closing price
  - Since TIPS do not always mature on exactly the same dates as nominal Treasuries, a tolerance of up to 45 days difference in maturity is allowed
- CPI Daily Index Ratios for all selected TIPS, as published by the US Treasury .
- A derived inflation curve, which is calculated from zero-coupon inflation swaps and provides constant maturity rates at 1Y, 2Y, etc.
- Weightings determined by IBA for blending the implied inflation rates determined from the two source instrument types. These will be determined periodically based upon IBA’s assessment of the relative volumes of TIPS versus inflation-linked swaps trading in the fixed income markets. The initial weighting is 3:1.

## 1.3 CALCULATION STEPS

The calculation occurs on each “Calculation Date” (any US business day), after market close.

### 1.3.1 IDENTIFY AVAILABLE TIPS INSTRUMENTS

Select TIPS instruments current on the Calculation Date, subject to a maximum coupon rate of 1%

### 1.3.2 FIND A MATCHING TREASURY INSTRUMENT FOR EACH TIPS

For each TIPS in turn, find the nearest-maturing Treasury bill, note or bond which meets the following conditions:

- Maturing on or after the maturity date of the TIPS.
- Maturing no more than 45 days after the maturity date of the TIPS
- Coupon rate no greater than 3% (for notes and bonds only)

### 1.3.3 CALCULATE PROJECTED INFLATION RATE TO MATURITY FOR THIS TIPS

- **For each TIPS in turn:**

- Retrieve end of day price, maturity date and coupon for the TIPS and for its matching Treasury instrument on the Calculation Date
- Calculate yield for the Treasury and use this to calculate discount factors for each TIPS coupon date.
  - Note that this assumes the net yields of the Treasury and the TIPS are comparable, despite slightly different maturities
  - Calculations are based on T+1 settlement and Actual/Actual
  - IBA is seeking market feedback as to whether or not seasonality adjustments should be included in these calculations.
- Construct a model to calculate NPV for the TIPS using the calculated discount factors, the CPI Daily Index Ratios, and the TIPS end of day price, assuming an (unknown) inflation rate of  $R$ .
  - Cash flows are initial purchase price, accrued interest, coupon payments and redemption value, all discounted according to the calculated discount factors.
  - It is assumed that all instruments have biannual coupons
- Find the optimal value of  $R$  which closely approximates a zero NPV for the TIPS, at the end of day price.
- This optimal value of  $R$  is the implied annualized inflation rate for the life of the TIPS.

#### 1.3.4 INTERPOLATE TIPS-DERIVED RATES FOR 1Y, 5Y, 6Y, 10Y MATURITIES FROM ADJACENT TIPS

- **For each of the four maturities required to determine the published rates (1,5,6 and 10 Years):**
  - Determine a maturity date exactly  $n$  years from the Calculation Date.
  - Determine actual days to maturity to this end date (e.g. this might be 365 or 366 for a 1Y)
  - If there is a TIPS with exactly the required days to maturity, use the calculated inflation rate for that TIPS; otherwise, perform a straight-line interpolation between the adjacent TIPS maturities, based on days to maturity, to determine the rate for this required maturity

#### 1.3.5 RETRIEVE SWAP-BASED INFLATION CURVE

- **For each of the four required maturities (1,5,6 and 10 Years):**
  - Determine the rate from the swap-based inflation curve for this maturity, at the end of the market day on the Calculation Date.

#### 1.3.6 CALCULATE 'BLENDED' RATES FOR 1Y, 5Y, 6Y, 10Y MATURITIES

- **For each of the four required maturities (1,5,6 and 10 Years):**  
Calculate a weighted average of the two rates (TIPS-Derived and swap-based inflation curve)

- Initially the weighting is 3:1 in favour of TIPS, e.g. :
- $Weighted\ Average\ Rate = \frac{3 \times (TIPS\ derived\ rate) + 1 \times (Swap\ based\ Inflation\ Curve\ Rate)}{4}$

- The weighting ratio will be reviewed periodically (e.g. 6 monthly) to reflect IBA's assessment of the relative trading volumes of the two instrument types.

### 1.3.7 CALCULATE 1Y, 1X5 FORWARD AND 5X5 FORWARD RATES FOR PUBLICATION

- The 1 Year inflation ("INFL 1Y") rate will be set to the blended rate for 1Y maturity as calculated in the previous step.
- The 5 Year inflation, 1 Year forward ("FWD INFL 1x5Y") rate will be calculated from the blended rates for 1Y ("INFL 1Y") and 6Y ("INFL 6Y") as follows:

$$\text{○ FWD INFL 1x5Y} = \left( \frac{(1 + \text{INFL 6Y})^6}{(1 + \text{INFL 1Y})} \right)^{\frac{1}{5}} - 1$$

- The 5 Year inflation, 5 Years forward ("FWD INFL 5x5Y") rate will be calculated from the blended rates for 5Y and 10Y as follows:

$$\text{○ FWD INFL 5x5Y} = \left( \frac{(1 + \text{INFL 10Y})^{10}}{(1 + \text{INFL 5Y})^5} \right)^{\frac{1}{5}} - 1$$

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