FUTURES PRICING MANUAL

Public Information

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General Provisions

This Manual presents the procedures to calculate settlement prices for financial derivatives futures contracts whose underlying assets are interest rates, foreign exchange, stock indices, crypto assets, or commodities.

The required calculation parameters, procedures, and criteria described are changed monthly and should be consulted in the Monthly Parameter Annex for the month in question.

In the event of partial or total unavailability of the inputs needed for the methodologies described in this Manual, and/or due to events of an economic or operational nature that may hinder price calculation coordination or the application of the corresponding methodology, B3, through its Market Risk Technical Committee, may at its sole discretion, arbitrate settlement prices.

Inputs used to price futures contracts are obtained from orders and trades on the trading floor, mainly through the **electronic closing call** and the **average calculation window** (). Other trading data, prices, and economic indicators may also be used. The **electronic closing call** is a mechanism at the end of the trading session used to set a single price for all trades that occur in the call, even if orders have different prices. The **average calculation window** is a trading period that uses trades made in that period and orders open at the end of the window to define the contract settlement price in accordance with the methodologies defined in this Manual.

A set sequence of procedures is used to calculate the settlement price of electronic closing call Futures contracts. If the first procedure cannot be applied, the second will be, and so forth successively until the settlement price is determined. The procedures involve the following definitions:

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Market Pricing

(i) **Valid trade,** typically denoted as the first procedure (P1), are the contract/expiration trades that meet the following conditions:

- Is present at the electronic closing call or during average calculation window.
- A minimum quantity traded (lots quantity of trade or trades grouping sum) greater than or equal to the "Minimum contracts quantity" threshold set by the Liquidity Group for the contract/expiration in question, as shown in the Monthly Parameters Annex.
- A minimum trades number carried out (how many trades separately were carried out, regardless of the quantity of each trade) greater than or equal to the "minimum trades number" limit threshold set by the contract in question, as shown in the Monthly Parameters Annex. If the limit is not explicitly defined, the minimum of 1 trade will be considered.

(ii) **Valid Order**, is defined as an electronic closing call order that meets the following three conditions:

- Is present at the electronic closing call;
- 30 seconds minimum exposure;
- A Quantity greater than or equal to the minimum quantity threshold set by the Liquidity Group for the contract/expiration in question, as shown in the Monthly Parameters Annex. Traded contracts that have the same bid or ask price are also considered when assessing the quantity of bid and ask orders.

If there is more than one valid bid/ask order, the highest bid order the lowest ask order will be considered to be the valid order.

(iii) **Valid bid-ask spread**, can be calculated in two ways, according to the Monthly Parameters Annex:

- Difference: the difference between the best **valid buy order** (VBO); and the best **valid sell order** (VSO) that is smaller than or equal to the

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threshold set ($Spread_{Max.}$) by the Liquidity Group for the contract/expiration in question, as shown in the Monthly Parameters Annex. As per the condition below:

$$\begin{cases} \text{if } VSO - VBO \leq Spread_{Máx.} \rightarrow Spread\ is\ valid \\ \text{otherwise } Spread\ is\ not\ valid \end{cases}$$

- Percentual: the difference between the best **valid buy order** (VBO); and the best **valid sell order** (VSO) divided by the mid between the best **valid buy order** (VBO) and the best **valid sell order** (VSO), that is smaller than or equal to the threshold set ($Spread_{Max.}$) by the Liquidity Group for the contract/expiration in question, as shown in the Monthly Parameters Annex. As per the condition below:

$$\begin{cases} \text{if } \dfrac{VSO - VBO}{\dfrac{VSO + VBO}{2}} \leq Spread_{Máx.} \rightarrow Spread\ is\ valid \\ \text{otherwise } Spread\ is\ not\ valid \end{cases}$$

(iv) VWAP: Volume weighted average price, it is the top offers weighted average of the books captured in the capture time interval defined for the product, with a total interval time T, for each registered book at t seconds inside the interval, with the first orders book is the book in the exactly at the beginning time interval, and the last orders book is the book in the second immediately before the ending time interval, resulting in a total if $N = T/t$ books inside de capture interval time.

For each registered book (i), is computed:

- OC_i, volume average price of the top bid orders, when the sum of contracts equals the minimum:

$$OC_i = \frac{\sum_n q_{i,n} * P_{i,n}}{Q_{min}}$$

$P_{i,n}$ bid offer of book i at level n;

Q_{min} contracts minimum quantity;

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$q_{i,1} = min\{Q_{i,1}, Q_{min}\}$;

$q_{i,n} = min\{Q_{i,n}, Q_{min} - \sum_{j=1}^{n-1} q_{i,j}\}$, when $n > 1$; e

$Q_{i,n}$ contracts quantity at level n of book i.

- OV_i, volume average price of the top ask orders, when the sum of contracts equals the minimum:

$$OV_i = \frac{\sum_n q_{i,n} * P_{i,n}}{Q_{min}}$$

$P_{i,n}$ ask offer of book i at level n;

Q_{min} contract minimum quantity;

$q_{i,1} = min\{Q_{i,1}, Q_{min}\}$;

$q_{i,n} = min\{Q_{i,n}, Q_{min} - \sum_{j=1}^{n-1} q_{i,j}\}$, when $n > 1$; e

$Q_{i,n}$ contracts quantity at level n of book i.

- If there was computation of OC_i and OV_i , then the Mid price (OM_i) price is defined as follows:

$$OM_i = \frac{OV_i + OC_i}{2}$$

only when the relation between OC_i and OV_i meets "Valid bid-ask spread" (*iii* topic of chapter) for book i.

Once all the books where analyzed, the final prices are given by the arithmetic average of the prices defined by the books i with value generated (bid, ask, mid). For the price to be considered as valid, the number of books m with price computed should be greater than the minimum for the contract M.

$OFC = \frac{\sum_{j=1}^{m} OC_j}{m}$, where m is the number of books with OC_j computed

$OFV = \frac{\sum_{j=1}^{m} OV_j}{m}$, where m is the number of books with OV_j computed

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$OFM = \frac{\sum_{j=1}^{m} OM_j}{m}$, where m is the number of books with OM_j computed.

(v) **Volume-Weighted Average Price at the End of the Closing Call**, which is the weighted average of the best offers, from the book, verified at the end of the Closing Call, for each month n.

For each book captured, for purchase ($Book_C$) and for sale ($Book_V$) respectively, at the end of the Closing Call, the average is calculated (OFC^n average for purchases, and OFV^n average for sell) of the best active orders at the end of the Closing Call ($P_{OfC,i}^n$ for buy orders, or $P_{OfV,i}^n$ for sell orders), weighted by the respective order quantity ($Q_{OfC,i}^n$ for buy orders, or $Q_{OfV,i}^n$ for sell orders).

The minimum quantity Q_{min}^n, will limit the orders to be considered in the calculation of each average, so that the sum of the quantities of each considered best offer is exactly equal to the minimum quantity. The last order to be considered, if it exceeds the minimum quantity, will be considered in the enough proportion for the sum to reach the minimum quantity on maturity n. If the sum of all Book X order quantities does not reach the Minimum Quantity, the weighted average OFX^n will not be considered valid.

$$from\ the\ buy\ book: OFC^n = \frac{\sum_i q_{OfC,i}^n * P_{OfC,i}^n}{Q_{min}^n}$$

$$from\ the\ sell\ book\ de\ compra: OFV^n = \frac{\sum_i q_{OfV,i}^n * P_{OfV,i}^n}{Q_{min}^n}$$

Where:

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$$q_{OfX,1}^{n} = min\{Q_{OfX,1}^{n}, Q_{min}\};$$
$$q_{OfX,i}^{n} = min\{Q_{OfX,i}^{n}, Q_{min}^{n} - \sum_{j=1}^{i-1} q_{OfX,j}^{n}\}, \text{ when } i > 1.$$

It is possible to set a parameter to consider the trades carried out in the Closing Call, in the calculation of the Weighted Average, in case these trades do not have enough quantity to define the price using the pricing method per trades (see topic **Valid Trade**). In this case, trades will be considered together with orders (only in one of the books, buy or sell), grouped by the same trade price $P_{NEG}^{n}$and orders ($P_{OfC,i}^{n}$ for buy, or $P_{OfV,i}^{n}$ for sell), adding the quantities of offers ($Q_{OfC,i}^{n}$ for purchases and $Q_{OfV,i}^{n}$ for sell) and Q_{NEG}^{n} trades.

$$if\ P_{NEG}^{n} = P_{OfC,i}^{n} \Rightarrow QT_{Ofc,i}^{n} = Q_{Ofc,i}^{n} + Q_{NEG}^{n}$$
$$if\ P_{NEG}^{n} = P_{OfV,i}^{n} \Rightarrow QT_{OfV,i}^{n} = Q_{OfV,i}^{n} + Q_{NEG}^{n}$$

And the weighted average OC_{X}^{n} of each book will be calculated using the Total Quantities of Trades and Offers QT, for each level of the Book, until the Minimum Quantity Q_{min}^{n} is reached. In the same way as using orders only, if the sum of all total quantities of a book *X* does not reach the Minimum Quantity, the weighted average OC_{X}^{n} referring to the book will not be considered valid.

$$from\ the\ buy\ book: OFC^{n} = \frac{\sum_{i} qt_{OfC,i}^{n} * P_{OfC,i}^{n}}{Q_{min}^{n}}$$

$$from\ the\ sell\ book: OFV^{n} = \frac{\sum_{i} qt_{OfV,i}^{n} * P_{OfV,i}^{n}}{Q_{min}^{n}}$$

Where:

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$$qt^n_{OfX,1} = min\{QT^n_{OfX,1}, Q_{min}\};$$
$$qt^n_{OfX,i} = min\{QT^n_{OfX,i}, Q^n_{min} - \sum_{j=1}^{i-1} qt^n_{OfX,j}\}, \text{ when } i > 1.$$

Note that orders will be considered, if they meet a minimum exposure time (t^n_{MIN}) within the Closing Call, to be considered valid. This time will be counted from the last modification of the order $t^n_{LastModif,i}$., until the end of the closing Call of expiry n ($t^n_{EndCall}$). The order must be present at the end of the closing call.

$$t^n_{EndCall} - t^n_{LastModif,i} > t^n_{MIN}$$

If the average of the buy orders OFC^n and the average of the ask orders OFV^n have been calculated and validated for a given month n, the mid price (OFM^n) will be given by the formula below, since the spread between OFV^n and OFC^n does not exceed the limit spread ($Spread^n_{MAX}$) for the expiry date:

$$OFM^n = \frac{OFC^n + OFV^n}{2},$$

only when the relation between OC_i and OV_i meets "Valid bid-ask spread" (*iii* topic of chapter) for book i.

If the mid OFM^n is valid, it will be the final price for the order step of that month n. Otherwise, and if the average bid price OFC^n and/or the average ask price OFV^n are valid, they may be used to validate ***the Theoretical Price*** (Fallback) for the month in question, as described in the next chapter.

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Theoretical Pricing

When **Market Pricing** requirements are not met, other procedures can be adopted to determine the **Theoretical Price (TP)** for adjusting the contract respecting the conditions below.

Theoretical Pricing when there are valid futures contract orders.

If there is a **valid order**, the final settlement price (SP) of the contract is defined using the criteria below:

1. If there is a **valid buy order** (VBO), then VBO≤ SP:

$$SP = max(VBO, TP)$$

2. If there is a **valid sell order** (VSO), then $SP \leq VSO$:

$$SP = min(VSO, TP)$$

3. If there is a **valid buy order** (VBO) and a **valid sell order** (VSO), then

$$\text{VBO} \leq SP \leq VSO:$$

$$\begin{cases} if\ TP < \text{VBO}, & SP = \text{VBO} \\ if\ TP > \text{VSO}, & SP = \text{VSO} \\ otherwise, & SP = TP \end{cases}$$

The electronic closing call pricing criteria aims to maximize the quantity of traded contracts. Therefore, although orders may have different prices, all trades for the same expiration carried out at the electronic closing call are closed at a single price.

Finally, this manual presents the methodology used to define the official settlement price for each contract.

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Daily Price Fluctuation

Regardless of the pricing model used, whether marking to market price or marking to theoretical price, the final daily settlement price must respect the 'Daily Trading Oscillation' limit.

The calculation rules for these limits are available on our website, under *Solutions > Platforms > PUMA Trading System > Dor members and traders > Rules and trading parameters > Trading rules*, in the file **Daily price fluctuation**.

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1 INTEREST RATES

1.1 Average One-Day Interbank Deposit Rate Futures Contract (DI1)

The settlement price for the Average One-Day Interbank Deposit Rate Futures Contract is expressed as an annualized interest rate.

The procedure sequence to determine the settlement price for a given DI1 expiration

If it is the last business day before contract expiration, the settlement price as a rate of the first expiration will correspond to the CDI (Interbank Deposit Certificate) rate of the day. If the contract expiring is due in January, the settlement price will be based on procedures P1 and P2, or, in their absence, the CDI reference rate of the day will be used.

P1. The settlement price will be the weighted arithmetic average of the trades carried out for that month, in the time interval according to the parameters of the Annex of Monthly Parameters of the calculation date.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average of the Mid-VWAP offer with **valid bid-ask spreads** for that expiration as per the parameters stipulated in Table 1 of the Monthly Parameters Annex (the Mid-VWAP is defined in General Provisions section).

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be calculated using by summing (i) the settlement price for the expiration in question on the immediately preceding day with (ii) the settlement price variation of the expiration in question, which is calculated by linear interpolation of the day's settlement price variation in relation to the immediately preceding day of the immediately previous(a) and following(p) expirations with settlement prices determined by P1 or P2, as per equation (1.0). Linear interpolation of the settlement price's daily variation in relation to the immediately

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preceding day ensures that settlement prices with missing inputs have fluctuations compatible with the fluctuation of the already traded contract expirations.

$$PA_{i,t} = PA_{i,t-1} + \left(\Delta_a + (\Delta_p - \Delta_a) \times \frac{(DC_i - DC_a)}{(DC_p - DC_a)}\right) \quad (1.0)$$

Where:

$PA_{i,t}$= settlement price for expiration i on the calculation date resulting from the application of procedure P3, rounded to the third decimal place;

$PA_{i,t-1}$= settlement price for expiration i on the business day prior to the calculation date;

Δ_a = $PA_{a,t} - PA_{a,t-1}$= difference between the settlement prices of the calculation date and the previous business day for the expiration with settlement price immediately before the interpolated expiration;

Δp = PAp,t − PAp,t−1 = difference between the settlement prices of the calculation date and the previous business day for the expiration with settlement price immediately after the interpolated expiration;

DCa = the number of calendar days between the calculation date and the expiration date *a*;

DCp = the number of calendar days between the calculation date and the expiration date p;

DCi = number of calendar days between the calculation date and the expiration date of the interpolated expiration i.

P3.1. If it is the first trading day of the contract *i* and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and a following expiration (*p*) with a

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settlement price defined by P1 or P2, the settlement price of contract *i* will be obtained from the exponential interpolation of the forward term structure, given by equation (1.1):

$$PA_i = \left((1 + SP_a)^{\frac{DU_a}{252}} \times \left(\frac{(1+PA_p)^{\frac{DU_p}{252}}}{(1+PA_a)^{\frac{DU_a}{252}}} \right)^{\frac{DU_i - DU_a}{DU_p - DU_a}} \right)^{\frac{252}{DU_i}} - 1 \qquad (1.1)$$

where:

PAi = settlement price for the expiration *i* resulting from exponential interpolation, rounded to the third decimal place;

PAa = settlement price for the expiration a immediately preceding the interpolated expiration (expiration i);

PAp = settlement price for the expiration p immediately subsequent to the interpolated expiration (expiration i);

DUa = number of trading days between the calculation date and the expiration date of the expiration a;

DUp = number of trading days between the calculation date and the expiration date of the expiration p;

DUi = number of trading days between the calculation date and the expiration date of the interpolated expiration i.

P4. If procedure P3 cannot be applied due to the absence of a later expiration settlement price, the settlement price for the expiration in question will be calculated using equation (1.2) by summing (i) the settlement price for the expiration in question on the immediately preceding day with (ii) the daily settlement price variation on the day immediately preceding the last expiration

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settlement price. If the price obtained through this procedure does not result in a **valid order price** (i.e. the price is lower than a **valid bid price** or higher than a **valid ask price**), the settlement price will be the **valid order price** with the closest value. In this situation, this expiration (v − 1) will be considered a reference for the second part of the equation (1.2) for all longer expiration.

$PA_{v,t}$ = settlement price for expiration *i* on day *t* with v − 1 being the expiration immediately preceding v. The calculation procedure P4 uses equation (1.2), rounded to the third decimal place:

$$PA_{i,t} = PA_{i,t-1} + \Delta_{i-1,t} \tag{1.2}$$

Where:

$\Delta_{i-1,t} = PA_{i-1,t} - PA_{i-1,t-1}$ = daily variation of the expiration i − 1 in t.

P5. If procedure P3 cannot be applied due to the absence of a preceding expiration settlement price, including first expiration defined by P1 or P2, the following procedure is used to determine the settlement price of the expiration in question:

E1. The settlement price is defined as the weighted average trading price at interval time defined for the contract, even if it does not have the minimum amount required (see Annex of Monthly Parameters) to be considered valid;

E2. If there are no trades defined at E1, the weighted average of the trades made that day up until the moment before the start of the interval time of the price definition;

E3. If there is no previous expiration settlement price as defined by E1 or E2, the one-day variation of the immediate subsequent expiration in which the settlement price was defined by P1, P2, E1, or E2 is applied to the settlement price of the previous day of the contract in question;

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E4. If there is a previous expiration settlement price as defined by E1 or E2 and a later expiration defined by P1, P2, E1, or E2, the settlement price is obtained by linearly interpolating the daily settlement price variation in relation to the immediately previous day (Equation 1.0), using the immediately previous expiration where the settlement price was defined by E1 or E2 and the immediately subsequent expiration where the settlement price was defined by P1, P2, E1, or E2 as pivots in the interpolation.

1.2 DI x U.S. Dollar Spread Futures (DDI)

The ID x U.S. Dollar Spread Futures Contract settlement price is expressed as an annualized interest rate.

DDI settlement prices are calculated using non-arbitrage formulas. The methodology for calculating the first open expiration differs from the methodology for calculating other expirations. On the two days prior to the expiration date of the first open expiration, the methodology for the other expirations is not uniform, due to the rollover of the short DI x U.S. Dollar Spread Futures (short leg) of the FRA on the ID x U.S. Dollar spread (FRC) as shown in section 1.3 and used as input for the calculation of settlement prices.

1.2.1 First Open Expiration

The settlement price for the first DDI expiration is calculated using equation (1.3):

$$PA_{DDI_t^{1exp}} = \left(\frac{\left(1+\frac{PA_{DI_t^{1exp}}}{100}\right)^{\frac{DU_{1exp}}{252}}}{\left(\frac{PA_{DOL_t^{1exp}}}{DOLPtax_{t-1} \times 1000}\right)} - 1 \right) \times \frac{360 \times 100}{DC_{1exp}} \qquad (1.3)$$

Where:

$PA_{DDI_t^{1exp}}$ = settlement price for the first DDI expiration on the date *t,* rounded to the third decimal place;

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$PA_{DI_t^{1exp}}$ = settlement price for the first DI1 expiration on the date *t*;

$PA_{DOL_t^{1exp}}$ = settlement price for the first expiration of the U.S. Dollar Futures Contract (DOL), as referenced in section 2.1, on the date *t*;

$DOLPtax_{t-1}$ = Brazilian Real per U.S. Dollar exchange selling rate using PTAX800, published by the Central Bank of Brazil on the date $t - 1$;

DU_{1exp} = number of trading days between the calculation date *t* and the date of the first DI1 expiration;

DC_{1exp} = number of calendar days between the calculation date *t* and the date of the first DDI expiration.

1.2.2 Other Open Expirations

Settlement prices for other DDI expirations are calculated using equation(1.4):

$$PA = \left(\left(1 + PA_{DDI^{1exp}} \times \frac{DC_1}{360\times100}\right) \times \left(1 + PA_{FRC^n} \times \frac{DC_n - DC_1}{360\times100}\right) - 1\right) \times \frac{360\times100}{DC_n} \quad (1.4)$$

Where:

PA_{DDI^n} = settlement price for the nth DDI expiration, rounded to the third decimal place;

$PA_{DDI^{1exp}}$ = settlement price for the first DDI expiration;

PA_{FRC^n} = settlement price for the nth FRC expiration;

DC_n = number of calendar days between the calculation date *t* and the date of the nth FRC expiration;

DC_1 = number of calendar days between the calculation date *t* and the date of the first DDI expiration.

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In the two-day period prior to the expiration of the first open expiration, the other expirations will be dealt with using the process below.

Second Open Expiration

Settlement price for the second open DDI expiration is calculated using equation (1.5):

$$PA_{DDI_t^{2exp}} = \left(\frac{\left(1+\frac{PA_{DI1_t^{2exp}}}{100}\right)^{\frac{DU_{2exp}}{252}}}{\left(\frac{PA_{DOL_t^{2exp}}}{DOLPtax_{t-1} \times 1000}\right)} - 1 \right) \times \frac{360 \times 100}{DC_{2exp}} \qquad (1.5)$$

Where:

$PA_{DDI_t^{2exp}}$ = settlement price for the second DDI expiration on the date *t*; rounded to the third decimal place,

$PA_{DI1_t^{2exp}}$ = settlement price for the second DI1 expiration on the date *t*;

$PA_{DOL_t^{2exp}}$ = settlement price for the second DOL expiration on the date *t* ;

$DOLPtax_{t-1}$ = Brazilian Real per U.S. Dollar exchange selling rate using PTAX800, published by the Central Bank of Brazil on the date $t-1$;

DU_{2exp} = number of trading days between the calculation date t and the date of the second DI1 expiration;

DC_{2exp} = number of calendar days between the calculation date *t* and the date of the second DDI expiration.

Other Open Expirations

Settlement prices for other DDI expirations are calculated using equation (1.6):

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$$PA_{DDI^n} = \left(\left(1 + PA_{DDI^{2exp}} \times \frac{DC_2}{360\times100}\right) \times \left(1 + PA_{FRC^n} \times \frac{DC_n - DC_2}{360\times100}\right) - 1\right) \times \frac{360\times100}{DC_n} \quad (1.6)$$

Where:

PA_{DDI^n} = settlement price for the nth DDI expiration, rounded to the third decimal place;

$PA_{DDI^{2exp}}$ = settlement price for the second DDI expiration;

PA_{FRC^n} = settlement price for the nth FRC expiration;

DC_n = number of calendar days between the calculation date and the date of the nth FRC expiration;

DC_2 = number of calendar days between the calculation date and the date of the second DDI expiration.

1.3 FRA on ID x U.S. Dollar Spread (FRC)

The Structured Transaction Forward Rate Agreement on DI x U.S. Dollar Spread settlement price is expressed as an annualized interest rate.

The procedure sequence to determine the settlement price for a given expiration.

P1. The settlement price will be the price established at the electronic closing call for the expiration in question.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average **valid bid prices** and **valid ask prices** with **valid bid-ask spreads** for that expiration as per the parameters stipulated in Table 2 of the Monthly Parameters Annex.

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be calculated using equation (1.7) by summing (i) the settlement

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price for that expiration on the day immediately prior to (ii)the settlement price variation of the expiration in question, which is calculated by linear interpolation of the day's settlement price variation in relation to the immediately preceding day of the immediately previous(*a*) and following(*p*) expirations with settlement prices determined by P1 or P2.

$$PA_{i,t} = PA_{i,t-1} + \left(\Delta_a + (\Delta_p - \Delta_a) \times \frac{(DC_i - DC_a)}{(DC_p - DC_a)}\right) \quad (1.7)$$

Where:

$PA_{i,t}$ = settlement price for the expiration *i* on the calculation date resulting from the application of procedure P3, rounded to the second decimal place;

$PA_{i,t-1}$ = settlement price for the expiration *i* on the business day preceding the calculation date or recalculated by equation (1.7.1) on the rollover date of the short end of the FRC;

Δ_a = $PA_{a,t} - PA_{a,t-1}$ =difference in settlement prices between the calculation date and the previous business day for the expiration *i* with the settlement price immediately before the interpolated expiration;

Δ_p = $PA_{p,t} - PA_{p,t-1}$ =difference in settlement prices between the calculation date and the previous business day for the expiration *i* with the settlement price immediately after the interpolated expiration;

DC_a= number of calendar days between the calculation date and the expiration date *a*;

DC_p= number of calendar days between the calculation date and the expiration date p;

DC_i = number of calendar days between the calculation date and the expiration date of interpolated expiration *i*.

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On the FRC short leg rollover date, the previous business day's settlement price used in equation (1.7), is recalculated to take into account the new short leg DDI expiration *i*. The FRC settlement price for the previous day is recalculated using equation (1.7.1).

$$PA^{*}{}_{FRC^{i},t-1} = \left(\frac{\frac{PA_{FRC^{i}_{t-1}}}{360\times100}\times\left(DC_{FRC^{i}}-DC_{DDI_{1}}\right)+1}{\frac{PA_{FRC^{1}_{t-1}}}{360\times100}\times\left(DC_{FRC^{1}}-DC_{DDI_{1}}\right)+1} - 1 \right) \times \frac{360\times100}{DC_{FRC^{i}}-DC_{FRC^{1}}} \qquad (1.7.1)$$

Where:

$PA^{*}{}_{FRC^{i},t-1}$ =settlement price for expiration *i* of the FRC on the business day preceding the calculation date, recalculated so as to consider the new short leg rollover; rounded to the second decimal place,

$PA_{FRC^{i}_{t-1}}$ = settlement price for the FRC expiration *i,* corresponding to the FRC long leg on the business day after the calculation date.

$PA_{FRC^{1}_{t-1}}$ = settlement price for the most recent FRC expiration *i* that is no longer trading, on the business day preceding the calculation date;

$DC_{FRC^{1}}$= number of calendar days between the business day preceding the calculation date and the expiration date of most recent FRC expiration that is no longer trading;

$DC_{FRC^{i}}$= number of calendar days between the business day following the calculation date and the FRC expiration date *i* :

$DC_{DDI_{1}}$= number of calendar days between the business day preceding the calculation date and the expiration date of most recent DDI expiration that is no longer trading;

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P3.1. If it is the first trading day of the contract *i* and no settlement price has been determined by the P1 or P2 procedures, having a previous expiration (a) with a settlement price defined by P1 or P2 and a subsequent expiration (p) with a settlement price defined by P1 or P2, the settlement price of contract *i* will be obtained using equation (1.8) which uses exponential interpolation of the settlement prices of the expirations immediately before and immediately after.

$$PA_i = \left(\left(1 + PA_a \times \frac{DC_a}{360\times100}\right) \times \left(\frac{\left(1+PA_p\times\frac{DC_p}{360\times100}\right)}{\left(1+PA_a\times\frac{DC_a}{360\times100}\right)} \right)^{\left(\frac{DU_i-DU_a}{DU_p-DU_a}\right)} - 1 \right) \times \frac{360\times100}{DC_i} \quad (1.8)$$

Where:

PA_i = settlement price for expiration i resulting from exponential interpolation;PA_a = settlement price for the expiration *a* immediately preceding the interpolated expiration i, rounded to the second decimal place;

PA_p = settlement price for expiration *p* immediately following the interpolated expiration i;

DU_a = number of trading days between the calculation date and the expiration date of expiration *a*;

DU_p = number of trading days between the calculation date and the expiration date of expiration *p*;

DU_i = number of trading days between the calculation date and the expiration date of expiration *i*;

DC_a = number of calendar days between the calculation date and the expiration date of expiration a;

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DC_p = number of calendar days between the calculation date and the expiration date of expiration p;

DC_i = number of calendar days between the calculation date and the expiration date of expiration i.

P4. If procedure P3 cannot be applied due to the absence of a later expiration settlement price, the settlement price for the expiration in question will be calculated using equation (1.2) by summing (i) the settlement price for the expiration in question on the immediately preceding day with (ii) the daily settlement price variation on the day immediately preceding the last expiration settlement price. If the price obtained through this procedure does not result in a **valid order price** (i.e. the price is lower than a **valid bid price** or higher than a **valid ask price**), the settlement price will be the **valid order price** with the closest value. In this situation, this expiration (*i* − 1) will be considered a reference for the second part of the equation (1.9) for all longer expirations.

Where $PA_{i,t}$ = settlement price for the expiration *i* on day *t*, where *i* − 1 is the expiration immediately preceding *i*. Procedure P4 uses equation (1.9), rounded to the second decimal place:

$$PA_{i,t} = PA_{i,t-1} + \Delta_{i-1,t} \tag{1.9}$$

Where:

$\Delta_{i-1,t} = PA_{i-1,t} - PA_{i-1,t-1}$ = daily variation of expiration $i - 1$ in t.

P5. If procedure P3 cannot be applied due to the absence of a previous expiration with settlement price, including a first settle price as defined by P1 or P2, then procedures will by used to determine the settlement price or the expiration in question.

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E1. The settlement price is defined as the trading price at closing call, even if it does not have the minimum amount required (see Annex of Monthly Parameters) to be considered valid;

E2. If there are no trades at the closing call, the weighted average of the trades made that day up until the moment before the start of the closing call;

E3. If there is no previous expiration settlement price as defined by E1 or E2, the one-day variation of the immediate subsequent expiration in which the settlement price was defined by P1, P2, E1, or E2 is applied to the settlement price of the previous day of the contract in question;

E4. If there is a previous expiration settlement price as defined by E1 or E2 and a later expiration defined by P1, P2, E1, or E2, the settlement price is obtained by linearly interpolating the daily settlement price variation in relation to the immediately previous day (Equation 1.0), using the immediately previous expiration where the settlement price was defined by E1 or E2 and the immediately subsequent expiration where the settlement price was defined by P1, P2, E1, or E2 as pivots in the interpolation.

1.4 Futures on the Average Rate of One-Day Repurchase Agreements (OC1)

OC1 settlement price is expressed as an annualized interest rate and follows the same calculation procedures and parameters used for DI1 using section 1.1.

In the absence of closing call data that renders it impossible to perform the aforementioned procedures, the OC1 settlement price will be calculated using equation (1.10).

$$PA_{OC1_t^n} = PA_{DI1_t^n} + SPR_{Sel.CDI^t}^n \tag{1.10}$$

Where:

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$PA_{OC1_t^n}$ = settlement price for the nth OC1 expiration on date t, rounded to the third decimal place;

$PA_{DI1_t^n}$ = settlement price for nth DI1 expiration on date t.

$SPR^n_{Sel.CDI^t}$ = spread between the Selic and CDI rates for the nth expiration on date t.

The spread between the Selic and CDI rates for the expiration n is calculated using equation (1.11):

$$SPR^n_{sel.CDI^t} = \left(e^{LN(SPR_t^n)} - 1\right) \times PA_{DI1_t^n} \tag{1.11}$$

Where:

$PA_{DI1_t^n}$ = settlement price for nth DI1 expiration on date t.

$LN(SPR_t^n)$ = the logarithm of the spread between the Selic and CDI rates for the period corresponding to the nth expiration date on date t. The logarithm being the natural logarithm between the Selic and CDI rates using equation (1.12).

$$LN(SPR_t) = logn\left(\frac{Selic_t}{CDI_t}\right) \tag{1.12}$$

The logarithm of the spread between the Selic and CDI rates for period *DUn* is determined by the random process with mean reversion, with the value calculated using equation (1.13):

$$LN(SPR_t^n) = LN(SPR_{t-1}) \times e^{-k \times DU_n} + \theta \times (1 - e^{-k \times DU_n}) \tag{1.13}$$

The θ and k parameters are calculated using equations (1.14):

$$\theta = \frac{a}{1-b}$$

$$k = -logn(b) \tag{1.14}$$

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where a and b are estimated from the linear regression of the logarithm of the spread on date t against the spread on date $t-1$, considering a 63 business day window prior to the calculation date using equations (1.15).

$$a = \overline{LN(SPR_i)} - b \times \overline{LN(SPR_{i-1})}$$

$$b = \frac{\sum_{i=t-1}^{t-64}\left(LN(SPR_i) \times LN(SPR_{i-1})\right) - \frac{\left(\sum_{i=t-1}^{t-64} LN(SPR_i)\right) \times \left(\sum_{i=t-1}^{t-64} LN(SPR_{i-1})\right)}{63}}{\left(\sum_{i=t-1}^{t-64}\left(LN(SPR_{i-1})\right)^2\right) - \frac{\left(\sum_{i=t-1}^{t-64} LN(SPR_{i-1})\right)^2}{63}}$$

$$LN(SPR_i) = logn\left(\frac{Selic_i}{CDI_i}\right)$$

$$\overline{LN(SPR_i)} = \frac{\left(\sum_{i=t-1}^{t-64} LN(SPR_i)\right)}{63}$$

$$\overline{LN(SPR_{i-1})} = \frac{\left(\sum_{i=t-1}^{t-64} LN(SPR_{i-1})\right)}{63} \qquad (1.15)$$

Where:

i = index for the dates of the 63 business day window prior to the calculation date;

$Selic_i$ = Selic rate published by the Central Bank of Brazil on the date i;

CDI_i = CDI rate published by B3 on the date i.

1.5 U.S. Dollar Spread Futures Contract Referencing One-Day Repurchase Agreements (DCO)

The DCO settlement price is expressed as an annualized interest rate and follows the same procedures and calculation parameters used for the DDI using section 1.2, considering (i) substituting DI1 settlement prices with the OC1 settlement prices of the same expiration date and (ii) the substitution of FRC settlement prices with FRA settlement prices based on one-day repurchase agreements

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(FRO), presented in section 1.6, of the same expiration date, rounded to the third decimal place.

1.6 Forward Rate Agreement on One-Day Repurchase Agreements X U.S. Dollar Spread (FRO)

The settlement price for the Forward Rate Agreement (FRA) on One-Day Repurchase Agreements X U.S. Dollar Spread is expressed as an annualized interest rate and follows the same procedures and calculation parameters used for the FRC using section 1.3.

In the absence of closing call data that renders it impossible to perform the aforementioned procedures, the FRO settlement price will be calculated using equation (1.16):

$$PA_{FRO^n} = \left(Factor.PA_{FRC^n} \times \left(\frac{Factor.PA_{OC1^n}}{Factor.PA_{OC1^1}}\right) \times \left(\frac{Factor.PA_{DI1^1}}{Factor.PA_{DI1^n}}\right) - 1\right) \times \frac{360 \times 100}{DC_n - DC_1}$$

(1.16)

Where:

PA_{FRO^n} = settlement price for the nth FRO expiration, rounded to the second decimal place;

PA_{FRC^n} = settlement price for the nth expiration of the FRC Contract;

PA_{OC1^1} = settlement price of the first OC1 expiration;

DC_n = number of calendar days between the calculation date and the date of the nth FRO expiration;

DC_1 = number of calendar days between the calculation date and the date of the first FRO expiration;

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$Factor.PA$ = capitalization factor of the respective contract settlement price for the expiration period calculated using equations (1.17).

$$Factor.PA_{FRC^n} = \left(1 + PA_{FRC^n} \times \frac{DC_n - DC_1}{360 \times 100}\right)$$

$$Factor.PA_{OC1^n} = \left(1 + \frac{PA_{OC1^n}}{100}\right)^{\frac{DU_n}{252}}$$

$$Factor.PA_{OC1^1} = \left(1 + \frac{PA_{OC1^1}}{100}\right)^{\frac{DU_1}{252}}$$

$$Factor.PA_{DI1^1} = \left(1 + \frac{PA_{DI1^1}}{100}\right)^{\frac{DU_1}{252}}$$

$$Factor.PA_{DI1^n} = \left(1 + \frac{PA_{DI1^n}}{100}\right)^{\frac{DU_n}{252}} \qquad (1.17)$$

Where:

PA_{FRO^n} = settlement price for the nth FRO expiration;

PA_{FRC^n} = settlement price for the nth FRC expiration;

PA_{OC1^1} = settlement price for the first OC1 expiration;

PA_{OC1^n} = settlement price for the nth OC1 expiration;

PA_{D1^1} = settlement price for the first DI1 expiration;

PA_{DI1^n} = settlement price for the nth DI1 expiration;

DU_n = number of trading days between the calculation date t and the date of the nth expiration of the contract;

DU_1 = number of trading days between the calculation date t and the first expiration of the contract;

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DC_n = number of calendar days between the calculation date t and the date of the nth expiration of the contract;

DC_1 = number of calendar days between the calculation date and the date of the first expiration of the contract.

1.7 Extended Consumer Price Index (IPCA) Futures (IAP)

The IAP settlement price is expressed in UP points. It should be noted that the reference for this futures contract is the IPCA which is calculated and published by the Brazilian Institute of Geography and Statistics (IBGE).

IAP settlement prices are calculated using non-arbitrage formulas. It should be noted the calculation methodology of the first open expiration differs from the calculation methodology of other expirations on the last trading day and on the expiration date.

1.7.1 All Open Expirations

The settlement price for IAP expirations is given by equation (1.18):

$$PA_{IAP^n} = IPCA_{PRata,t} \times \frac{\left(1+RPre_{DI1}^{n}\right)^{\frac{DU_n}{252}}}{\left(1+CL_{IPCA^n}\right)^{\frac{DU_n}{252}}} \tag{1.18}$$

Where:

PA_{IAP^n} = settlement price for the nth IAP expiration;

$IPCA_{PRata,t}$ = pro rata IPCA for the calculation date t, calculated using equation (1.19);

$RPre_{DI1}^{n}$ = pre-defined rate for the period of nth IAP expiration, calculated by exponential interpolation of DI1 settlement prices using equation (1.1);

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CL_{IPCA^n} = real IPCA spread for the period of the nth expiration, calculated using equation (1.21);

DU_n = number of trading days between the calculation date and the expiration of the nth IAP expiration.

$$IPCA_{PRata,t} = IPCA_{15a} \times (1 + EIPCA_0)^{\frac{DU_{15a,t}}{DU_{15a,15p}}} \quad (1.19)$$

Where:

$IPCA_{15a}$ = most recently published IPCA by IBGE falling before the 15th day of the month;

$EIPCA_0$ = IPCA projection published by Anbima or the inflation rate, if published;

$DU_{15a,15p}$ = trading days between the 15th day of the previous and following months to the calculation date *t*;

$DU_{15a,t}$ = trading days between the 15th day of the previous month and the calculation date t .

1.7.2 First open expiration on the expiration date

The settlement price for the first IAP expiration on the expiration date will be the value of the IPCA index number (number of points) published by IBGE for the reference month.

1.8 IPCA Inflation Coupon Futures Contract (DAP)

The DAP settlement price is expressed in PU points, rounded to the third decimal place.

$$PA_{DAP^n} = \frac{100.000}{(1+PAT_{DAP^n})^{\frac{DU_n}{252}}} \quad (1.20)$$

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Where: PAT_{DAP^n} is the annualized compound settlement rate of the n-th DAP maturity, determined according to the procedures described below.

1.8.1 All Open Expirations

Procedure sequence to determine the settlement price for a given DAP expiration.

P1. The settlement price will be the price established at the electronic closing call for the expiration in question based on **valid trades** (see the methodology in the **GENERAL PROVISIONS** chapter at the beginning of this manual), according to **the Quantity Limit** parameter stipulated in Table 5 of the *Monthly Parameters Annex*.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) of the valid bid and asks offers, with valid bid-ask spread, calculated according to the methodology of **Volume-Weighted Average Price at the End of the Closing Call** (see methodology in the **GENERAL PROVISIONS** chapter at the beginning of this manual) for this maturity, observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 5 of the *Monthly Parameters Annex*.

P3. If it is not possible to apply the P2 procedure, the settlement rate (PAT_{DAP^n}) shall be calculated based on the theoretical model, following the steps described below:

3.1. If the maturity is the first DAP maturity, and if it falls within the period between the date of official inflation disclosure by *IBGE*, inclusive, and the business day prior to maturity, the rate for the first maturity Fallback shall be calculated using the following formula:

$$PAT_{DAP^1} = \left(\left(\left[\frac{\left(\frac{TxPre_{DAP^1}}{100}+1\right)^{du_{DAP^1}/252}}{\left(\frac{InflaçãoOficial}{100}+1\right)^{du_{DAP^1}/DU_{15a,15p}}} \right]^{252/du_{DAP^1}} \right) - 1 \right) * 100 \quad (1.21)$$

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Where:

$TxPre_{DAP^1}$ is the Pre rate in % per year for the vertex coinciding with the first DAP maturity (DAP^1), calculated as described in Chapter 2.1 – DI X PRE Curve of the **B3 Curves Manual**;

$InflaçãoOficial$ is the official inflation variation rate, in % per month, of the official IPCA published by IBGE;

du_{DAP^1} is the term in business days between the calculation date (exclusive) and the first DAP maturity (DAP^1) (inclusive);

$DU_{15a,15p}$ is the term in business days between the 15th immediately prior ($15a$) to the calculation date (exclusive) and the 15th immediately after ($15p$) the calculation date (inclusive).

3.2. If the DAP settlement rate has not been determined by step 3.1., and if the maturity coincides with an NTNB maturity (IPCA Government Bonds), it shall be marked according to the formula below:

$$PAT_{DAP^n} = NTNB_n^{Anbima} - Casado_n \tag{1.22}$$

Onde:

$NTNB_n^{Anbima}$ is the rate of the IPCA government bond (NTNB) from the secondary market, obtained at the close of the same calculation date, published by *Anbima*;

$Casado_n$ is the spread between the rate in % per year referring to the IPCA government bonds, and the rate in % per year referring to the DAP, of the

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same maturity n, determined according to the topic ***NTN-B Casado Rate Methodology*** described below (Section 1.8.2).

3.3. If the DAP settlement rate has not been determined by step 3.2., it shall be marked according to the formula below:

$$PAT_{DAP^n,t} = CupomTeor_{DAP^n,t} + SpreadTeor_{DAP^n,t-1} \quad (1.23)$$

Where:

$CupomTeor_{DAP^n,t}$ is the theoretical IPCA coupon rate, in % per year, of the same maturity n, determined on the same calculation date t, according to the topic ***Theoretical IPCA Coupon Methodology*** described below (Section 1.8.3);

$SpreadTeor_{DAP^n,t-1}$ is the spread between the rate in % per year referring to the DAP final adjustment, and the theoretical IPCA coupon rate in % per year determined according to the topic ***Theoretical IPCA Coupon Methodology*** described below (Section 1.8.3), both determined for the calculation date referring to the last trading day $(t-1)$ of the DAP future.

$$SpreadTeor_{DAP^n,t-1} = PAT_{DAP^n,t-1} - CupomTeor_{DAP^n,t-1} \quad (1.24)$$

1.8.2 NTN-B Casado Rate Methodology

The NTN-B Casado rate is commonly observed in the market at maturities where both the DAP and the NTN-B rate are traded. The market reference is given according to the formula below, in % per year, rounded to 4 decimal places:

$$Casado_n = NTNB_n - DAP_n \quad (1.25)$$

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The NTN-B Casado rate is commonly observed in the market at maturities where both the DAP and the NTN-B rate are traded. The market reference is given according to the formula below, in % per year, rounded to 4 decimal places:

a) *Casado by Informant Pool*: The Casado information for maturities ($Casado_n$), shall be captured through an Informant Pool, collected on the same calculation date, provided that the parameters for ***Minimum Number of Informants and Trading Volume*** from Table 5 of the Monthly Parameters Annex are observed for capture. For each maturity n, the Casado rate ($Casado_n$) shall be defined by the average of all informants i:

$$Casado_n = \frac{\sum_{i=1}^{M} Casado_n^i}{M} \quad (1.26)$$

i. If rates for all maturities n have been reported, the above average shall determine the final rate for each maturity.

ii. In case only some maturities have not been reported, interpolation methodologies shall be used:

- *Flat Forward 252*: if there is at least one prior maturity ($Casado_{ant}$) if there is at least one prior maturity ($Casado_{pos}$), with the Casado Rate determined by the above average (equation 1.26). The complete description of this interpolation can be found in topic 1.4.2. of the **B3 Curves Manual**;
- *Flat Extrapolation (Beginning)*: if there is only one subsequent maturity ($Casado_{pos}$) with the Casado Rate determined by the above average (equation 1.26). The complete description of this extrapolation can be found in topic 1.4.8. of the **B3 Curves Manual**;
- *Flat Extrapolation (End)*: if there is only one prior maturity ($Casado_{ant}$) with the Casado Rate determined by the above average (equation 1.26). The complete description of this

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extrapolation can be found in topic 1.4.7. of the **B3 Curves Manual**;

b) Casado determined by B3 on the previous day: if the Informant Pool information does not meet the parameters, the casado value shall be considered as that obtained at the DAP close of the previous day ($Casado_{n,t-1}^{B3}$):

$$Casado_{n,t} = Casado_{n,t-1}^{B3} = NTNB_{n,t-1}^{Anbima} - PAT_{DAP^n,t-1} \qquad (1.27)$$

Where:

$NTNB_{n,t-1}^{Anbima}$ is the rate in % per year of the government bond with IPCA coupon from the secondary market for the same maturity n, obtained at the close of the previous trading day $t-1$, and published by Anbima;

$PAT_{DAP^n,t-1}$ is the final adjustment rate in % per year of the DAP contract for maturity n, obtained at the close of the previous trading day $t-1$.

1.8.3 Theoretical IPCA Coupon Methodology

Used for DAP maturities at maturities not coinciding with IPCA Government Bond (NTNB) maturities, and with term between the calculation date and maturity of up to 2 years maximum. The rate ($CupomTeor_{n,t}$) is given according to the following formula, in % per year, rounded to 7 decimal places:

$$CupomTeor_{n,t} = \left(\left(\frac{\left(1+\frac{TxPre_{DAP^n}}{100}\right)^{\frac{du_{DAP^n}}{252}}}{\left(1+\frac{Premio_{NTNB^m}}{100}\right)^{\frac{du_{DAP^n}}{252}} * (FatorIPCA_n)} \right)^{\frac{252}{du_{DAP^n}}} - 1 \right) * 100 \qquad (1.28)$$

Where:

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n: index referring to IPCA Coupon Futures (DAP) maturities up to 2 years term (inclusive);

$TxPre_{DAP^n}$ is the Pre rate in % per year for the vertex coinciding with maturity n of the DAP, calculated as described in Chapter 2.1 – DI X PRE Curve of the **B3 Curves Manual**;

$FatorIPCA_n$: effective factor corresponding to the accumulated monthly IPCA between the calculation date and the maturity date of the n-th maturity of the IPCA Coupon Future (DAP), as described in the topic **Implicit Monthly IPCA Factor Focus/Anbima Methodology** described below (Section 1.8.5);

du_{DAP^n} is the term in business days between the calculation date (exclusive) and the n-th maturity of the DAP (DAP^n) (inclusive);

$Premio_{NTNB^m}$: premium, in % per year, between (i) the inflation implicit in the price of the m- th NTNB maturity (NTNBs with term du_{NTNB^m} up to 2 years) and (ii) the market expectation for IPCA, as described in the topic **NTN-B Implicit Inflation Premium Methodology** described below (Section 1.8.4). The determination of index m of the NTNB, whose premium shall be used, is such that:

- du_{NTNB^m}, term in business days between the calculation date and the NTNB maturity, shall be strictly <u>greater than</u> du_{DAP^n};
- when there is no term du_{NTNB^m} greater than du_{DAP^n}, the NTNB with the longest maturity M (with term up to 2 years), whose term is du_{NTNB^M} , shall be used

1.8.4 NTN-B Implicit Inflation Premium Methodology

The premium represents the premium over the implicit IPCA inflation at the calculation date, above/below the implicit inflation since the last market inflation

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expectation disclosures (*Anbima* and *Focus*). It is determined considering the closing price of the calculation date, from nearby NTN-Bs.

The premium is given in % per year with rounding to the 7th decimal place, and is obtained by the following formula:

$$Prêmio_{NTNB^m} = \left(\left(\left[\frac{\left(1+\frac{TxPre_{NTNB^m}}{100}\right)^{\frac{du_{NTNB^m}}{252}}}{\left(1+\frac{NTNB_m^{Anbima}}{100}\right)^{du_{NTNB^m}/252} * FatorIPCA_m} \right]^{\frac{252}{du_{NTNB^m}}} \right) - 1 \right) * 100 \qquad (1.29)$$

Where:

$NTNB_m^{Anbima}$ is the indicative rate (coupon) of the m- th NTNB maturity, in % per year, published by Anbima;

$FatorIPCA_m$ is the factor corresponding to the accumulated monthly IPCA between the calculation date and the maturity date of the m- th NTNB maturity, calculated according to the topic Implicit **Implicit Monthly IPCA Factor Focus/Anbima Methodology** described below (Section 1.8.5);

du_{NTNB^m} is the number of business days between the calculation date (exclusive) and the maturity date (inclusive) of the m- th NTNB maturity;

$TxPre_{NTNB^m}$ is the Pre rate in % per year for the vertex coinciding with maturity m da NTNB, of the NTNB, calculated as described in Chapter 2.1 – DI X PRE Curve of the **B3 Curves Manual**.

1.8.5 Implicit Monthly IPCA Factor Focus/Anbima Methodology

Corresponds to the expectation of Implicit Inflation accumulated monthly between the calculation date and, determined in % for the effective period, with rounding

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to the 8th decimal place. The accumulated monthly factor shall be calculated as follows:

a) If $k = 0$, that is, for the calculation of the factor considering the inflation of the current month, it shall be calculated on a pro-rata basis between the calculation date and the maturity of the next 15th day after the calculation date ($15p$):

$$FatorIPCA_0 = \left(1 + {EIPCA_0}/{100}\right)^{\frac{du_{t,15p}}{du_{15a,15p}}} \tag{1.30}$$

b) If $k \geq 1$, that is, for the calculation of the factor considering maturities on the 15th days of subsequent months, the product between the pro-rata of the current month's inflation and the expectations for IPCA of all months up to the last month with disclosure by Focus/BACEN prior to the term to be calculated is considered:

$$FatorIPCA_k = \left(1 + {EIPCA_0}/{100}\right)^{\frac{du_{t,15p}}{du_{15a,15p}}} \times \prod_{i=1}^{k}\left(1 + {EIPCA_i}/{100}\right) \tag{1.31}$$

where:

k is the integer number representing the number of full months between the calculation date and the maturity to be calculated;

$EIPCA_0$ is the IPCA projection in % p.m. (percentage per month) published by Anbima, or the official inflation of the current month itself, if the latter has already been published by IBGE;

$15a$ is the 15th day immediately prior or equal to the calculation date, and adjusted to the next business day if this day is not one;

$15p$ is the 15th day immediately after the calculation date, and adjusted to the next business day if this day is not one;

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$du_{t,15p}$ is the count of business days between the calculation date (t) (exclusive) and the immediately following 15th day $(15p)$ (inclusive);

$du_{15a,15p}$ is the count of business days between the immediately prior 15th day $(15a)$ (exclusive) and the immediately following 15th day $(15p)$ (inclusive) to the calculation date;

$EIPCA_i$ is the market expectation for IPCA, in % p.m. (percentage per month) of month i, published by the Central Bank of Brazil in the Focus – Market Report (average rate of informants).

Exception: From the date of official IPCA disclosure of the month in question, and until the maturity of the DAP referring to the same, the Anbima IPCA preview shall be used for the market expectation for the next reference month ($IPCA_{2^{a}\,previa}$), replacing the expectation published by the Central Bank of Brazil in the Focus – Market Report ($EIPCA_{i=1}$).

$$EIPCA_{i=1} = IPCA_{2^{a}\,previa}$$

For usage purposes, the new Anbima IPCA preview shall be used from the business day following its disclosure.

1.9 Mexico TIIE de Fondeo a Un Día Rate Futures Contract (TIE)

The settlement price for the Mexico *TIIE de Fondeo a Un Día* (F-TIIE) Futures Contract is expressed as an annualized interest rate, rounded to 3 decimal place.

The procedure sequence to determine the settlement price for a given expiration

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On the contract expiration date, the settlement price, expressed as rate, for the first maturity will correspond to the most recent F-TIIE rate, made available by the end of the adjustment determination window, provided by the Central Bank of Mexico.

P1. The settlement price will be the **weighted average** (see General Provisions, Market Pricing, Valid Trades) of the trades conducted during the capture window on the calculation date, respecting the minimum quantity of trades and contracts according to the parameters in Table 12 of the Annex of Monthly Parameters. The traded rate is rounded to the third decimal place in percentage.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average of the Mid-VWAP offer with **valid bid-ask spreads** for that expiration as per the parameters stipulated in Table 12 of the Monthly Parameters Annex (the Mid-VWAP is defined in General Provisions section).

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be the value of the vertex corresponding to the maturity term on the F-TIIE zero curve, constructed from the discount factors obtained by LSEG/Refinitiv, as per Table 1.1, at the contract closing time, according to Table 12 of the Annex of Monthly Parameters, calculated by 1.22 formula, described below:

$$TxLin_{JUR^{v,t}} = \left(\frac{1}{FD_{JUR^{v,t}}} - 1\right) \times \frac{36000}{DC_v} \tag{1.22}$$

Where:

- $TxLin_{JUR^{v,t}}$: is the interest rate in % per annum linear, in calendar days based on 360, according to the contract standard;
- $FD_{JUR^{v,t}}$: is the discount factor for the interest rate curve captured from LSEG/Refinitiv, as per Table 1.1, for vertex v, on calculation date t, for the respective contract;

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- DC_v: term in calendar days for vertex v, on calculation date t;

For trading days on B3 that are holidays in Mexico (as defined by the Bank of Mexico), the procedures described earlier will not be applied in determining the daily settlement rate and price of the contract. The settlement price will be determined by:

$$\mathrm{PA}_{\mathrm{TIE}^{\mathrm{n,t}}} = \mathrm{PA}_{\mathrm{TIE}^{\mathrm{n,t-1}}} \times \mathrm{FC}_{\mathrm{t}}$$

Where:

$\mathrm{PA}_{\mathrm{TIE}^{\mathrm{n,t-1}}}$= Adjustment price of the TIE contract, for the respective maturity n, for the previous trading date t-1;

FC_{t}= Correction factor of the adjustment price of the TIE contract, for the trading date t, calculated as described in the draft of the respective contract.

The settle rate $\mathrm{TA}_{TIE^{\mathrm{n,t}}}$ will be determined by:

$$\mathrm{TA}_{\mathrm{TIE}^{\mathrm{n,t}}} = \left(\frac{100.000}{\mathrm{PA}_{\mathrm{TIE}^{\mathrm{n,t}}}} - 1\right) \times \frac{36.000}{\mathrm{DC}_{\mathrm{n}}}$$

Where:

DC_{n}= term in calendar days for maturity n, on calculation date t.

Table 1.1 – RIC (Reuters Instrument Code) identifiers of the discount factors obtained from LSEG/Refinitiv for calculating the international zero-coupon yield curve

F-TIIE	SOFR	ESTR
MXNFDTOISONZ=R	USDSROISONZ=R	EURESTOISONZ=R
MXNFDTOISTNZ=R	USDSROISTNZ=R	EURESTOISTNZ=R
MXNFDTOIS1WZ=R	USDSROIS1WZ=R	EURESTOIS1WZ=R
MXNFDTOIS1MZ=R	USDSROIS1MZ=R	EURESTOIS1MZ=R
MXNFDTOIS2MZ=R	USDSROIS2MZ=R	EURESTOIS2MZ=R
MXNFDTOIS3MZ=R	USDSROIS3MZ=R	EURESTOIS3MZ=R

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MXNFDTOIS6MZ=R	USDSROIS6MZ=R	EURESTOIS6MZ=R
MXNFDTOIS9MZ=R	USDSROIS9MZ=R	EURESTOIS9MZ=R
MXNFDTOIS1YZ=R	USDSROIS1YZ=R	EURESTOIS1YZ=R
MXNFDTOIS1Y3MZ=R	USDSROIS1Y3MZ=R	EURESTOIS1Y3MZ=R
MXNFDTOIS1Y6MZ=R	USDSROIS1Y6MZ=R	EURESTOIS1Y6MZ=R
MXNFDTOIS1Y9MZ=R	USDSROIS1Y9MZ=R	EURESTOIS1Y9MZ=R
MXNFDTOIS2YZ=R	USDSROIS2YZ=R	EURESTOIS2YZ=R
MXNFDTOIS2Y3MZ=R	USDSROIS2Y3MZ=R	EURESTOIS2Y3MZ=R
MXNFDTOIS2Y6MZ=R	USDSROIS2Y6MZ=R	EURESTOIS2Y6MZ=R
MXNFDTOIS2Y9MZ=R	USDSROIS2Y9MZ=R	EURESTOIS2Y9MZ=R
MXNFDTOIS3YZ=R	USDSROIS3YZ=R	EURESTOIS3YZ=R
MXNFDTOIS3Y3MZ=R	USDSROIS3Y3MZ=R	EURESTOIS3Y3MZ=R
MXNFDTOIS3Y6MZ=R	USDSROIS3Y6MZ=R	EURESTOIS3Y6MZ=R
MXNFDTOIS3Y9MZ=R	USDSROIS3Y9MZ=R	EURESTOIS3Y9MZ=R
MXNFDTOIS4YZ=R	USDSROIS4YZ=R	EURESTOIS4YZ=R
MXNFDTOIS4Y3MZ=R	USDSROIS4Y3MZ=R	EURESTOIS4Y3MZ=R
MXNFDTOIS4Y6MZ=R	USDSROIS4Y6MZ=R	EURESTOIS4Y6MZ=R
MXNFDTOIS4Y9MZ=R	USDSROIS4Y9MZ=R	EURESTOIS4Y9MZ=R
MXNFDTOIS5YZ=R	USDSROIS5YZ=R	EURESTOIS5YZ=R
MXNFDTOIS5Y3MZ=R	USDSROIS5Y3MZ=R	EURESTOIS5Y3MZ=R
MXNFDTOIS5Y6MZ=R	USDSROIS5Y6MZ=R	EURESTOIS5Y6MZ=R
MXNFDTOIS5Y9MZ=R	USDSROIS5Y9MZ=R	EURESTOIS5Y9MZ=R
MXNFDTOIS6YZ=R	USDSROIS6YZ=R	EURESTOIS6YZ=R
MXNFDTOIS6Y3MZ=R	USDSROIS6Y3MZ=R	EURESTOIS6Y3MZ=R
MXNFDTOIS6Y6MZ=R	USDSROIS6Y6MZ=R	EURESTOIS6Y6MZ=R
MXNFDTOIS6Y9MZ=R	USDSROIS6Y9MZ=R	EURESTOIS6Y9MZ=R
MXNFDTOIS7YZ=R	USDSROIS7YZ=R	EURESTOIS7YZ=R
MXNFDTOIS7Y3MZ=R	USDSROIS7Y3MZ=R	EURESTOIS7Y3MZ=R
MXNFDTOIS7Y6MZ=R	USDSROIS7Y6MZ=R	EURESTOIS7Y6MZ=R
MXNFDTOIS7Y9MZ=R	USDSROIS7Y9MZ=R	EURESTOIS7Y9MZ=R
MXNFDTOIS8YZ=R	USDSROIS8YZ=R	EURESTOIS8YZ=R
MXNFDTOIS8Y3MZ=R	USDSROIS8Y3MZ=R	EURESTOIS8Y3MZ=R
MXNFDTOIS8Y6MZ=R	USDSROIS8Y6MZ=R	EURESTOIS8Y6MZ=R
MXNFDTOIS8Y9MZ=R	USDSROIS8Y9MZ=R	EURESTOIS8Y9MZ=R
MXNFDTOIS9YZ=R	USDSROIS9YZ=R	EURESTOIS9YZ=R
MXNFDTOIS9Y3MZ=R	USDSROIS9Y3MZ=R	EURESTOIS9Y3MZ=R
MXNFDTOIS9Y6MZ=R	USDSROIS9Y6MZ=R	EURESTOIS9Y6MZ=R
MXNFDTOIS9Y9MZ=R	USDSROIS9Y9MZ=R	EURESTOIS9Y9MZ=R
MXNFDTOIS10YZ=R	USDSROIS10YZ=R	EURESTOIS10YZ=R

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	USDSROIS11YZ=R	EURESTOIS11YZ=R
	USDSROIS12YZ=R	EURESTOIS12YZ=R
	USDSROIS13YZ=R	EURESTOIS13YZ=R
	USDSROIS14YZ=R	EURESTOIS14YZ=R
	USDSROIS15YZ=R	EURESTOIS15YZ=R

1.10 United States of America Secured Overnight Financing Rate Futures Contract (SFR)

The settlement price for the United States of America Secured Overnight Financing Rate (SOFR) Futures Contract is expressed as an annualized interest rate, rounded to 3 decimal place.

The procedure sequence to determine the settlement price for a given expiration

On the contract expiration date, the settlement price, expressed as rate, for the first maturity will correspond to the most recent SOFR rate, made available by the end of the adjustment determination window, provided by the Federal Reserve Bank of Nova York.

P1. The settlement price will be the **weighted average** (see General Provisions, Market Pricing, Valid Trades) of the trades conducted during the capture window on the calculation date, respecting the minimum quantity of trades and contracts according to the parameters in Table 12 of the Annex of Monthly Parameters. The traded rate is rounded to the third decimal place in percentage.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average of the Mid-VWAP offer with **valid bid-ask spreads** for that expiration as per the parameters stipulated in Table 12 of the Monthly Parameters Annex (the Mid-VWAP is defined in General Provisions section).

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P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be the value of the vertex corresponding to the maturity term on the SOFR zero curve, constructed from the discount factors obtained by LSEG/Refinitiv, as per Table 1.1, at the contract closing time, according to Table 12 of the Annex of Monthly Parameters, calculated by 1.22 formula, described previously.

For trading days on B3 that are holidays in United States of America (as defined by the Federal Reserve Bank of New York), the procedures described earlier will not be applied in determining the daily settlement rate and price of the contract. The settlement price will be determined by:

$$\mathrm{PA}_{SFR^{\mathrm{n,t}}} = \mathrm{PA}_{SFR^{\mathrm{n,t-1}}} \times \mathrm{FC_t}$$

Where:

$\mathrm{PA}_{\mathrm{TIE}^{\mathrm{n,t-1}}}$= Adjustment price of the SFR contract, for the respective maturity n, for the previous trading date t-1;

$\mathrm{FC_t}$= Correction factor of the adjustment price of the SFR contract, for the trading date t, calculated as described in the draft of the respective contract.

The settle rate $\mathrm{TA}_{\mathrm{SFR}^{\mathrm{n,t}}}$ will be determined by:

$$\mathrm{TA}_{\mathrm{SFR}^{\mathrm{n,t}}} = \left(\frac{100.000}{\mathrm{PA}_{\mathrm{SFR}^{\mathrm{n,t}}}} - 1\right) \times \frac{36.000}{\mathrm{DC_n}}$$

Where:

$\mathrm{DC_n}$= term in calendar days for maturity n, on calculation date t.

1.11 Europe Euro Short-Term Rate Futures Contract (EST)

The settlement price for the Europe Euro Short-Term Rate (ESTR) Futures Contract is expressed as an annualized interest rate, rounded to 3 decimal place.

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The procedure sequence to determine the settlement price for a given expiration

On the contract expiration date, the settlement price, expressed as rate, for the first maturity will correspond to the most recent ESTR rate, made available by the end of the adjustment determination window, provided by the European Central Bank.

P1. The settlement price will be the **weighted average** (see General Provisions, Market Pricing, Valid Trades) of the trades conducted during the capture window on the calculation date, respecting the minimum quantity of trades and contracts according to the parameters in Table 12 of the Annex of Monthly Parameters. The traded rate is rounded to the third decimal place in percentage.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average of the Mid-VWAP offer with **valid bid-ask spreads** for that expiration as per the parameters stipulated in Table 12 of the Monthly Parameters Annex (the Mid-VWAP is defined in General Provisions section).

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be the value of the vertex corresponding to the maturity term on the ESTR zero curve, constructed from the discount factors obtained by LSEG/Refinitiv, as per Table 1.1, at the contract closing time, according to Table 12 of the Annex of Monthly Parameters, calculated by 1.22 formula, described previously.

For trading days on B3 that are holidays in Europe (as defined by European Central Bank, TARGET2 holidays), the procedures described earlier will not be applied in determining the daily settlement rate and price of the contract. The settlement price will be determined by:

$$\mathrm{PA}_{EST^{\mathrm{n,t}}} = \mathrm{PA}_{EST^{\mathrm{n,t-1}}} \times \mathrm{FC}_{\mathrm{t}}$$

Where:

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$PA_{TIE^{n,t-1}}$ = Adjustment price of the EST contract, for the respective maturity n, for the previous trading date t-1;

FC_t= Correction factor of the adjustment price of the EST contract, for the trading date t, calculated as described in the draft of the respective contract.

The settle rate $TA_{EST^{n,t}}$ will be determined by:

$$TA_{EST^{n,t}} = \left(\frac{100.000}{PA_{EST^{n,t}}} - 1\right) \times \frac{36.000}{DC_n}$$

Where:

DC_n= term in calendar days for maturity n, on calculation date t.

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2 FOREIGN EXCHANGE

2.1 U.S. Dollar Futures (DOL) and Mini U.S. Dollar Futures (WDO)

The U.S. Dollar Futures Contract and Mini U.S. Dollar Futures Contract settlement prices are expressed in Brazilian Reals per USD1,000 rounded to the third decimal place.

DOL settlement prices are calculated using non-arbitrage formulas. The methodology for calculating the first open expiration differs from other expirations. In the two-day period preceding the expiration date of the first open expiration, the methodology of the second expiration is not uniform due to the rollover of the FRC short leg and the rollover of the DOL from the first to the second expiration.

WDO settlement prices are the settlement prices for the respective DOL expirations.

2.1.1 First open expiration

The settlement price for the first DOL expiration is the weighted arithmetic average of the trades between **3:50-4:00 pm**[1] on the calculation date, rounded to the third decimal place.

2.1.2 Other expirations

The settlement prices for other DOL expirations are calculated using equation (2.1):

$$PA_{DOL_t^n} = DOLPtax_{t-1} \times \frac{\left(1+\frac{PA_{DI1_t^n}}{100}\right)^{\frac{DU_n}{252}}}{\left(1+PA_{DDI_t^n}\times\frac{DC_n}{36.000}\right)} \quad (2.1)$$

[1] Calculation period including (t): 3:50 PM ≤ t ≤ 4:00 PM

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Where:

$PA_{DOL_t^n}$ = settlement price for the nth DOL expiration on date t, rounded to the third decimal place;

$PA_{DI1_t^n}$ = settlement price for the nth DI1 expiration on the date t;

$PA_{DDI_t^n}$ = settlement price for the nth DDI expiration on the date t;

$DOLPtax_{t-1}$ = Brazilian Real per U.S. Dollar exchange selling rate using PTAX800, published by the Central Bank of Brazil on the date $t - 1$;

DU_n = the number of trading days between the calculation date t and the date of the nth DI1 expiration;

DC_n = the number of calendar days between the calculation date t and the calculation date of the nth DDI expiration.

When there is a DOL expiration that does not correspond to the DI1 and/or DDI, the settlement prices necessary to calculate the DOL settlement price using equation (2.1) will be calculated by interpolation, using equations (1.1) and (1.8), respectively.

2.1.3 Second open expiration

The second open DOL expiration will have its settlement price calculated differently than stipulated in the previous section, on the dates described below.

Business day preceding the last trading day of the first open expiration.

The settlement price for the second DOL open expiration is calculated using equation (2.2):

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$$PA_{DOL^2} = PA_{DOL^1} + DR1_{DOL}^{1.2} \quad (2.2)$$

Where:

PA_{DOL^2} = settlement price for the second DOL expiration, rounded to the third decimal place;

PA_{DOL^1} = settlement price for the first DOL expiration;

$DR1_{DOL}^{1.2}$ = weighted arithmetic average of U.S. Dollar Rollover Structured Transaction (DR1) first and second open expiration trades carried out between 3:50-4:00 pm on the calculation date.

Last trading day of the first open expiration

The settlement price for the second open DOL expiration is the weighted arithmetic average of the trades carried out between 3:50-4:00 pm on the calculation date.

2.1.4 First open expiration on the last trading day

The settlement price for the first DOL, on the expiration date, is the Brazilian Real per U.S. Dollar exchange selling rate, according to the PTAX800, published by the Central Bank of Brazil on the date $t - 1$.

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2.2 U.S. Dollar Swap with Reset Referencing One-Day Repurchase Agreement (SCS)

The U.S. Dollar Swap with Reset Referencing One-Day Repurchase Agreement settlement price is expressed as an annualized interest rate and follows the same procedures and calculation parameters used for the DCO, using section 1.2, of the same expiration date.

Due to the particularities of the U.S. Dollar Swap with Reset Referencing OneDay Repurchase Agreement, where the spread rates of a given expiration depend on the participant's total position in that expiration, among others, the settlement calculation is done for each participant from their positions and not in a standardized way, as in futures contracts. Each participant's positions are reset daily using equation (2.3):

$$PA_t^n = \left[CC_t - \frac{VF}{1+i_s \times \frac{DC_n}{360 \times 100}}\right] \times DOLPtax_{t-1} \times (1 + Selic_t)^{\frac{1}{252}} \qquad (2.3)$$

Where:

PA_t^n = settlement value of the position of the nth expiration on date t;

CC_t = spread rate for the day's updated position (the day's net position consolidated with the previous day's position and updated for the day), corresponding to the respective series on date t;

VF = value of the FInal Value leg;

CD_n = number of calendar days between the calculation date t and the date of the nth SCS position expiration;

i_s = B3 reference rate for Selic x U.S. Dollar transactions, which correspond to the DCO settlement price with the same expiration date. When said expiration is

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absent in the DCO, the reference rate will be calculated by interpolating the DCO settlement prices. The interpolation is explained in equation (1.8);

$DOLPtax_{t-1}$ = Brazilian Real per U.S. Dollar exchange selling rate using PTAX800, published by the Central Bank of Brazil on the date $t - 1$;

$Selic_t$ = Selic rate published by the Central Bank of Brazil on the date t.

A full description of SCS variables and their daily updates is available at www.bmfbovespa.com.br, Products, Interest Rates, OC1 x U.S. Dollar Spread, Swap.

2.3 Currency Futures in Brazilian Real

Settlement prices in Brazilian Real are calculated using non-arbitrage formulas. The calculation methodology for the first open contract differs from that of the other contracts on the last trading day and the expiration date.

This section has been structured in a way that presents a general formula (section 2.3.1) that accommodates all currency parity relationships and the calculation of foreign exchange coupons for different currencies. Table 2.1 in section 2.3.4 provides all the calculation parameters to be used in sections 2.3.1 and 2.3.2. Sections 2.3.2 and 2.3.3 determine the settlement price for the first contract one business day prior (fixing) and on the expiration day, respectively.

2.3.1 General Formula: All Expirations

The settlement price of Brazilian real currency futures contracts is expressed by the following equation:

$$PA_{X^n} = \left(\frac{PA_{DOL^n}}{N_{DOL}}\right) \times \left(\frac{PA_{(USD,X)^n}}{N_{(USD,X)}}\right)^{\alpha} \times N_X \qquad (2.4)$$

where:

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PA_{X^n} = The settlement value of currency X for the nth expiration, rounded to the third decimal place;

PA_{DOL^n} = Dollar future (DOL) settlement value to be determined as follows:

- For maturity n of the currency X contract being calculated that coincides with the respective maturity of the Brazilian real to commercial dollar futures contract (DOL), PA_{DOL^n} will be the closing settlement price of the respective maturity n of the Brazilian real to commercial dollar futures contract (DOL) on date t;
- For maturity n of the currency X contract being calculated that does not coincides with the respective maturity of the Brazilian real to commercial dollar futures contract (DOL), PA_{DOL^n} will be the vertex of the *Brazilian Real X Dollar Forward Curve* (PTX), as described in chapter 4.1 of the Curves Manual, whose term corresponds to the maturity n being calculated on date t, multiplied by 1000, as follows:

$$PA_{DOL^n} = PTX_n * 1000$$

N_{DOL} = Dolar future (DOL) notional amount of 1,000 Reais;

α = variable depending on the parity relationship of currency X. Based on Table 2.1:

If $\rho = \text{Direct}$, then $\alpha = 1$;

If $\rho = \text{Indirect}$, then $\alpha = -1$.

$PA_{(USD,X)^n}$ = Future settlement value of currency X in United States dollars of the nth expiration. In Table 2.1 there's the code of the respective future in US dollars (USD, X);

$N_{(USD,X)}$ = Notional amount in dollars of currency X, as defined in Table 2.1;

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N_X = Notional amount in currency X, as defined in Table 2.1.

2.3.2 General Formula: First open expiration on the last trading day (Fixing)

On the expiration date, the settlement price will be calculated using equation (2.5):

$$PA_X^{liq} = TP_{t,\rho} \times TD_t \times N \tag{2.5}$$

where::

PA_X^{liq} = settlement value price of currency X.

$TP_{t,\rho}$ = United States dollar per unit of currency X. ρ represents the parity between currency X and the US dollar (USD). If $\rho = Indirect$, $TP_{t,\rho} = \frac{1}{TP_{t,\rho,X}}$ is Used. Otherwise, $TP_{t,\rho} = TP_{t,\rho,X}$. This exchange rate is calculated by The World Markets Company PLC ("WM") and published by Reuters Limited ("Reuters"), on page WMRSPOT02, under the quote WM/Reuters Closing Spot Rate, on the calculation date t. If the currency is ARB or CLP, their rate will be, respectively, calculated by *Mercado Abierto Eletrónico* (MAE) and Chilean Central Bank. When the rate is unavailable due to a holiday abroad, the rate from day t-1 will be used.

N_X = Notional amount of currency X, defined in Table 2.1;

TD_t = Exchange rate of Brazilian reais per United States dollar, selling rate, disclosed by the Central Bank of Brazil through Sisbacen, transaction PTAX800, option "5", closing rate, for settlement in two days, on the calculation date t.

2.3.3 First open expiration on the expiration day

On the expiration date, the settlement price will be the settlement price calculated on the last trading day, as per subsection 2.3.2.

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2.3.4 Calculation definitions for all currencies in Brazilian reais

Table 2.1 - Parameters used in the general formulas of sections 2.3.1 and 2.3.2 to calculate the settlement price of specific currencies.

Currency	Future in Brazilian Reais code (X)	Parity Relationship (ρ)	N	Future in Dollar code (X, USD)	$N_{(USD,X)}$
Australian Dollar	AUD	Direct	1.000	AUS	1.000
Canadian Dollar	CAD	Indirect	1.000	CAN	1.000
New Zealand Dollar	NZD	Direct	1.000	NZL	1.000
Euro	EUR	Direct	1.000	EUP	1.000
	WEU	Direct	1.000		
Swiss Franc	CHF	Indirect	1.000	SWI	1.000
Yen	JPY	Indirect	100.000	JAP	1.000
Pound Sterling	GBP	Direct	1.000	GBR	1.000
Turkish Lira	TRY	Indirect	1.000	TUQ	1.000
Argentine Peso	ARB	Indirect	1.000	ARS	1.000
Chilean Peso	CLP	Indirect	1.000.000	CHL	1.000
Mexican Peso	MXN	Indirect	10.000	MEX	1.000
South African Rand	ZAR	Indirect	10.000	AFS	1.000

Table 2.2 - Curve vertices in CD (Calendar Days) for USD currency forwards with their respective RIC (Reuters Instrument Codes) on LSEG/Refinitiv.

CD	ARS	AUD	CAD	CHF	CLP	CNH	CNY	EUR
7		AUDSW	CADSW	CHFSW		CNHSW	CNYSW	EURSW
30	ARS1MNDF	AUDS1M	CAD1M	CHF1M	CLP1MNDF	CNH1M	CNY1M	EUR1M
60	ARS2MNDF	AUDS2M	CAD2M	CHF2M	CLP2MNDF	CNH2M	CNY2M	EUR2M
90	ARS3MNDF	AUDS3M	CAD3M	CHF3M	CLP3MNDF	CNH3M	CNY3M	EUR3M
180	ARS6MNDF	AUDS6M	CAD6M	CHF6M	CLP6MNDF	CNH6M	CNY6M	EUR6M
270	ARS9MNDF	AUDS9M	CAD9M	CHF9M	CLP9MNDF	CNH9M	CNY9M	EUR9M
360	ARS1YNDF	AUDS1Y	CAD1Y	CHF1Y	CLP1YNDF	CNH1Y	CNY1Y	EUR1Y
720		AUDS2Y	CAD2Y	CHF2Y	CLP2YNDF	CNH2Y	CNY2Y	EUR2Y
1800		AUDS5Y	CAD5Y	CHF3Y		CNH5Y	CNY5Y	EUR5Y

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CD	GBP	JPY	MXN	NOK	NZD	RUB	SEK	TRY	ZAR
7	GBPSW	JPYSW	MXNSW	NOKSW	NZDSW	RUBSW	SEKSW	TRYSW	ZARW
30	GBP1M	JPY1M	MXN1M	NOK1M	NZD1M	RUB1M	SEK1M	TRY1M	ZAR1M
60	GBP2M	JPY2M	MXN2M	NOK2M	NZD2M	RUB2M	SEK2M	TRY2M	ZAR2M
90	GBP3M	JPY3M	MXN3M	NOK3M	NZD3M	RUB3M	SEK3M	TRY3M	ZAR3M
180	GBP6M	JPY6M	MXN6M	NOK6M	NZD6M	RUB6M	SEK6M	TRY6M	ZAR6M
270	GBP9M	JPY9M	MXN9M	NOK9M	NZD9M	RUB9M	SEK9M	TRY9M	ZAR9M
360	GBP1Y	JPY1Y	MXN1Y	NOK1Y	NZD1Y	RUB1Y	SEK1Y	TRY1Y	ZAR1Y
720	GBP2Y	JPY2Y	MXN2Y	NOK2Y	NZD2Y	RUB2Y	SEK2Y	TRY2Y	ZAR2Y
1800	GBP5Y	JPY5Y	MXN5Y	NOK5Y	NZD3Y	RUB5Y	SEK3Y	TRY3Y	ZAR3Y
2160		JPY6Y							
2520		JPY7Y							
2880		JPY8Y							
3240		JPY9Y							
3600		JPY10Y							

2.3.5 Australian Dollar Futures (AUD)

The settlement price for the Australian Dollar Futures Contract is expressed in Brazilian reals per AUD1,000 and rounded to the third decimal.

The AUD settlement price is calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

2.3.6 Canadian Dollar Futures (CAD)

The settlement price for the Canadian Dollar Futures Contract is expressed in Brazilian reals per CAD1,000 and rounded to the third decimal.

The CAD settlement price is calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

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2.3.7 New Zealand Dollar Futures (NZD)

The settlement price for the New Zealand Dollar Futures Contract is expressed in Brazilian reals per NZD1,000 and rounded to the third decimal.

The NZD settlement price is calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

2.3.8 Euro Futures (EUR) and Mini Euro Futures (WEU)

The settlement price for the Euro Futures and Mini Euro Futures Contracts are expressed in Brazilian reals per EUR1,000 and rounded to the third decimal.

The EUR and WEU settlement price are calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

2.3.9 Swiss Franc Futures (CHF)

The settlement price for the Swiss Franc Futures Contract is expressed in Brazilian reals per CHF1,000 and rounded to the third decimal.

The CHF settlement price is calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

2.3.10 Yuan Dollar Futures (CNY)

The settlement price for the Yuan Dollar Futures Contract is expressed in Brazilian reals per CNY10,000 and rounded to the third decimal.

The CNY settlement price is calculated using the equation 2.6:

$$PA_{CNY^n} = g\left[g\left[\frac{BRL/USD_{cl}^{s}}{USD/CNY^{s}}\right] \times \frac{\left(1+\frac{PRE^n}{100}\right)^{\frac{DU_n}{252}}}{\left(1+CL_{BRL/CNY}^{n} \times \frac{DC_n}{360\times100}\right)}\right] \times 10.000 \qquad (2.6)$$

Where:

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PA_{CNY^n} = CNY's settlement value of the o nth expiration, rounded to the third decimal place;

$g[.]$ = a function that rounds to the seventh decimal place;

BRL/USD_{cl}^{s} = Spot Exchange rate quotation of Brazilian reais per United States dollar, clean coupon, determined by B3 at 4:00PM;

$USD/CNY^{s} =$ United States dollar per Yuan exchange rate, spoty quotation, determined by B3 at 4:00 PM using the CNY's Reuters Instrument Code (RIC) "CNY" in *Refinitiv/LSEG*.

PRE^{n} = DIxPRÉ rate for the n-th expiration, expressed as an annual percentage, linear, based on 252 business days. Its calculation methodology is available in the B3 Curve Manual, in the section 2.1*;*

DU_n = Number of trading days between the calculation date and the n-th expiration date of the contract;

DC_n = Number of calendar days between the calculation date and the n-th expiration date of the contract; and

$CL_{BRL/CNY}^{n}$ = Clean foreign Exchange coupon rate of Yuan for the n-th expiration, rounded to the seventh decimal place. Calculated as expressed in equation 2.7:

$$CL_{BRL/CNY}^{n} = \left[\left(1 + CL_{BRL/USD}^{n} \times \frac{DC_n}{360\times100}\right) \times FCC_{CNY}^{n} - 1\right] \times \frac{360\times100}{DC_n} \qquad (2.7)$$

Where:

$CL_{BRL/USD}^{n}$ = Clean foreign exchange coupon rate for United States dollars for the n-th expiration, expressed as an annual percentage, linear, based on 360 calendar days. Its calculation methodology is

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available in the B3 Curve manual, in section 4.5 Clean Dollar Coupon Curve (DOC);

FCC_{CNY}^{n} = Foreign Exchange Coupon Factor (FCC), extracted from the Implicit Exchange Variation (VC). Calculated using formula 2.8:

$$FCC_{USD/CNY}^{n} = \frac{USD/CNY_{n}^{f}}{USD/CNY^{s}} \tag{2.8}$$

Where:

USD/CNY_{n}^{f} = United States dollar per Yuan exchange rate, forward quotation for the n-th expiration, determined by B3 at 4:00 PM using the CNY's Reuters Instrument Code (TIC) as defined in Table 2.

2.3.11 Pound Sterling Futures (GBP)

The settlement price for the Pound Sterling Futures Contract is expressed in Brazilian reals per GBP1,000 and rounded to the third decimal.

The GBP settlement price is calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

2.3.12 Turkish Lira Futures (TRY)

The settlement price for the Turkish Lira Futures Contract is expressed in Brazilian reals per TRY1,000 and rounded to the third decimal.

The TRY settlement price is calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

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2.3.13 Argentine Peso Futures (ARB)

The settlement price for the Argentine Peso Futures Contract is expressed in Brazilian reals per ARB1,000 and rounded to the third decimal.

The ARB settlement price is calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

2.3.14 Chilean Peso Futures (CLP)

The settlement price for the Chilean Peso Futures Contract is expressed in Brazilian reals per CLP1,000,000 and rounded to the third decimal.

The CLP settlement price is calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

2.3.15 Mexican Peso Futures (MXN)

The settlement price for the Mexican Peso Futures Contract is expressed in Brazilian reals per MXN10,000 and rounded to the third decimal.

The MXN settlement price is calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

2.3.16 Yen Futures (JPY)

The settlement price for the Yen Futures Contract is expressed in Brazilian reals per JPY100,000 and rounded to the third decimal.

The JPY settlement price is calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

2.3.17 South African Rand Futures Contract (ZAR)

The settlement price for the South African Rand Futures Contract is expressed in Brazilian reals per ZAR10,000 and rounded to the third decimal.

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The ZAR settlement price is calculated using the equations from the General Formula Section, based on the definitions provided in Table 2.1.

2.4 Currency Futures in American Dollars

Currency future settlement prices in american dollars are calculated based on the 4:00 PM reference price from Refinitiv/LSEG. The calculation methodology for the first open contract differs from that of the other contracts on the last trading day and the expiration date.

This section has been structured in a way that presents a general formula (section 2.4.1) that accommodates the settlement calculation for all currencies. Table 2 in section 2.3.4 lists all the captured maturities from the provider. Sections 2.4.3 and 2.4.4 determine the settlement price for the first contract one business day prior (fixing) and on the expiration day.

2.4.1 All Open Expirations

The settlement price of the currency for each of the enabled curve vertices is given by equation (2.9).

$$PA_{X^n} = FWD_{X,n}^{USD} * N \tag{2.9}$$

where:

PA_X^{liq} = Settlement adjustment price of currency X, rounded to the third decimal place.

$FWD_{X,n}^{USD}$ = If the expiration n corresponds to the vertices listed in Table 2, the price will be the 4:00 PM capture of the FX Forward Swap on *Refinitiv/LSEG*. Otherwise, expiration n will be calculated based on section 1.4.5 - *Price Interpolation*, of the B3 Curve Manual. On dates when there is no rate disclosure, the adjust value of the last trading day is used.

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N = Notional amount in currency, as defined in the section of the respective currency X.

2.4.2 The first open contract on the last trading day

On the expiration date, the settlement price will be calculated using equation (2.10):

$$PA_X^{liq} = TP_{X,t} \times N \tag{2.10}$$

where:

PA_X^{liq} = Settlement adjustment price of currency X, rounded to the third decimal place.

$TP_{X,t}$ = The exchange rate of United States dollars (USD) per currency X is calculated by The World Markets Company PLC ("WM") and published by Reuters Limited ("Reuters") on page WMRSPOT02, under the quote WM/Reuters Closing Spot Rate, on the calculation date t. If the currency is ARS or CHL, their rate will be, respectively, calculated by *Mercado Abierto Eletrónico* (MAE) and Chilean Central Bank. When the rate is unavailable due to a holiday abroad, the rate from day t-1 will be used.

N = Notional amount in currency, as defined in the section of the respective currency.

2.4.3 The first open contract on the last trading day

On the expiration date, the settlement price will be the settlement price calculated on the last trading day, as per subsection 2.4.2.

2.4.4 U.S. Dollar per Euro Futures (EUP)

The settlement price for the U.S. Dollar per Euro Futures Contract is expressed in American Dollars per EUR1,000 to 3 decimal places.

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The settlement price is calculated using equations 2.9 and 2.10.

2.4.5 U.S. Dollar per Australian Dollar Futures (AUS)

The settlement price for the U.S. Dollar per Australian Dollar Futures Contract is expressed in American Dollars per AUD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

2.4.6 U.S. Dollar per British Pounds Sterling (GBR)

The settlement price for the U.S. Dollar per British Pounds Sterling Futures Contract is expressed in American Dollars per GBP1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

2.4.7 Chinese Yuan per U.S. Dollar Futures (CNH)

The settlement price for the Chinese Yuan per U.S. Dollar Futures Contract is expressed in Chinese Yuan per USD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

2.4.8 Swiss Franc per U.S. Dollar Futures (SWI)

The settlement price for the Swiss Franc per U.S. Dollar Futures Contract is expressed in Swiss Franc per USD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

2.4.9 Chilean Peso per U.S. Dollar Futures (CHL)

The settlement price for the Chilean Peso per U.S. Dollar Futures Contract is expressed in Chilean Peso per USD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

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2.4.10 Japanese Yen per U.S. Dollar Futures (JAP)

The settlement price for the Japanese Yen per U.S. Dollar Futures Contract is expressed in Japanese Yen per USD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

2.4.11 Mexican Peso per U.S. Dollar Futures (MEX)

The settlement price for the Mexican Peso per U.S. Dollar Futures Contract is expressed in Mexican Peso per USD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

2.4.12 Norwegian Krone per U.S. Dollar Futures (NOK)

The settlement price for the Norwegian Krone per U.S. Dollar Futures Contract is expressed in Norwegian Krone per USD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

2.4.13 U.S. Dollar Futures per New Zealand Dollar Futures (NZL)

The settlement price for the U.S. Dollar Futures per New Zealand Dollar Futures Contract is expressed in American Dollars per NZD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

2.4.14 Canadian Dollar per U.S. Dollar Futures (CAN)

The settlement price for the Canadian Dollar per U.S. Dollar Futures Contract is expressed in Canadian Dollar per USD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

2.4.15 Russian Ruble per U.S. Dollar Futures (RUB)

The settlement price for the Russian Ruble per U.S. Dollar Futures Contract is expressed in Russian Ruble per USD1,000 to 3 decimal places.

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The settlement price is calculated using equations 2.9 and 2.10.

2.4.16 Swedish Krona per U.S. Dollar Futures (SEK)

The settlement price for the Swedish Krona per U.S. Dollar Futures Contract is expressed in Swedish Krona per USD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

2.4.17 Turkish Lira per U.S. Dollar Futures (TUQ)

The settlement price for the Turkish Lira per U.S. Dollar Futures Contract is expressed in Turkish Lira per USD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

2.4.18 South African Rand per U.S. Dollar Futures (AFS)

The settlement price for the South African Rand per U.S. Dollar Futures Contract is expressed in South African Rand per USD1,000 to 3 decimal places.

The settlement price is calculated using equations 2.9 and 2.10.

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3 EQUITIES

3.1 Ibovespa Futures (IND) and Mini Ibovespa Futures (WIN)

The settlement prices for the Ibovespa Futures Contract (or Bovespa Index) and for the Mini Ibovespa Futures Contract are expressed as index point values in Brazilian Reals, each point BRL1.00.

IND settlement prices are calculated using non-arbitrage formulas. It should be noted that the calculation methodology of the first open expiration differs from the methodology for calculating other expirations. On the expiration date of the first open expiration, the methodology for calculating all expirations will also be different.

WIN settlement prices are the settlement prices of the respective IND expirations.

3.1.1 First open expiration

The settlement price for the first IND expiration is the weighted arithmetic average of the trades carried out for that month, in the time interval according to the parameters of Table 8 of the Annex of Monthly Parameters of the calculation date.

3.1.2 Reference price for the Structure Ibovespa rollover transaction (IR1)

The IR1 reference price will be used as an input for calculating the settlement price for other IND expirations because the IR1 has greater liquidity than the long IND expirations that compose the IR1 transaction.
The rollover transaction has no settlement price, but the spread between the two IND expirations, that compose the transaction, provides a reference price.

Procedure Sequence to determine the IR1 reference price

The reference price resulting from any procedure will respect valid order prices.

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P1. The reference price will be the price established at the electronic closing call for the expiration in question.

P2. If procedure P1 cannot be applied, the reference price for the expiration in question will be the average **valid bid prices** and **valid ask prices** with **valid bid-ask spreads** for that expiration as per the parameters stipulated in Table 3 of the Monthly Parameters Annex.

P3. If procedure P2 cannot be applied, the expiration in question will have no reference price

3.1.3 Other Expirations

Procedure sequence to determine the settlement price for other IND expirations

P1. If the IR1 for the IND expiration has a reference price, the corresponding settlement price will be given according to equation (3.1) by the sum of (i) the settlement price for the first expiration and (ii) the IR1 reference price:

$$PA_{IND^n} = PA_{IND^1} + PRef_{IR1}^{1.n} \tag{3.1}$$

Where:

PA_{IND^n} = settlement price for the $n$the IND expiration, rounded to the zero decimal place;

PA_{IND^1} = settlement price for the first IND expiration; and

$PRef_{IR1}^{1.n}$ = IR1 reference price from the first to the nth expiration.

P2. If the IR1 relevant to the IND expiration has no reference price, the corresponding settlement price will be calculated according to equation (3.2), based on (i) the settlement price for the first expiration, (ii) the fixed interest rate, and (iii) the cost of carry:

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$$PA_{IND^n} = PA_{IND^1} \times \frac{\left(1+\frac{RPre_{DI1}^{INDn}}{100}\right)^{\frac{DU_{INDn}}{252}} \times \left(1+\frac{RPre_{DI1}^{IND1}}{100}\right)^{\frac{-DU_{IND1}}{252}}}{\left(1+CC_{INDj}\right)^{\frac{DU_{INDn}-DU_{IND1}}{252}}} \quad (3.2)$$

Where:

PA_{IND^n} = settlement price for the $n$the IND expiration, rounded to the zero decimal place;

PA_{IND^1} = settlement price for the first IND expiration;

$RPre_{DI1}^{INDn}$ = Fixed rate for the term of the nth IND expiration, calculated by exponential interpolation of DI1 settlement prices according to equation (1.1);

$RPre_{DI1}^{IND1}$ = Fixed rate for the term of the first IND expiration, calculated by exponential interpolation of DI1 settlement prices according to equation (1.1);

DU_{IND1} = number of trading days between the calculation date and the expiration date of the first IND expiration;

DU_{INDn} = number of trading days between the calculation date and the expiration date of the $n$the IND expiration;

CC_{INDj} = cost of carry for the calculation of the settlement price for the IND expiration.

1. If the expiration in question has had its settlement price calculated based on the IR1 reference price (procedure P1) at any date prior to the calculation date, the cost of carry will be calculated according to equation (3.3), considering the parameters and prices on the date which the structured transaction had its reference price calculated.

2. If the expiration in question has not had its settlement price calculated based on the IR1 reference price at any date prior to the calculation date, the cost of carry will be the implied cost of carry in the settlement price for

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the IND expiration immediately prior to the nth expiration, rounded to the fourth decimal place. This cost will be determined by equation (3.3) or **equal to the previous day's cost of carry** if the settlement price for the immediately preceding expiration is calculated according to the trading average.

$$CC_{INDj} = \left(\left(\frac{\left(1+\frac{RPre_{DI1}^{INDn-1}}{100}\right)^{\frac{DU_{INDn-1}}{252}} \times \left(1+\frac{RPre_{DI1}^{IND1}}{100}\right)^{\frac{-DU_{IND1}}{252}}}{\left(\frac{PA_{IND^{n-1}}}{PA_{IND^{1}}}\right)} \right)^{\frac{252}{DU_{INDn-1}-DU_{IND1}}} - 1 \right) \quad (3.3)$$

Where:

$PA_{IND^{n-1}}$ = settlement price for the IND expiration immediately preceding the nth expiration;

$PA_{IND^{1}}$ = settlement price for the first IND expiration;

$RPre_{DI1}^{INDn-1}$ = fixed rate calculated by exponential interpolation of DI1 settlement prices according to equation (1.1) for the term of the nth IND expiration immediately preceding the nth IND expiration;

$RPre_{DI1}^{IND1}$ = fixed rate for the term of the first IND expiration, calculated using exponential interpolation of DI1 settlement prices according to equation (1.1);

DU_{IND1} = number of trading days between the calculation date and the expiration date of the first IND expiration;

DU_{INDn-1} = number of trading days between the calculation date and the expiration date immediately preceding the nth IND expiration.

3.1.4 All other expirations on the expiration date of the first open contract

a) First open expiration

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The settlement price for the first IND expiration is the Ibovespa settlement, calculated according to the arithmetic average of the values of the Ibovespa index published by B3 every 30 seconds of the last three trading hours in the spot market, excluding the closing call.

Second open expiration

The settlement price for the second IND expiration is the weighted arithmetic average of the trades carried out for that month, in the time interval according to the parameters of Table 8 of the Annex of Monthly Parameters of the calculation date.

b) Other open expirations

Procedure Sequence to determine the settlement price for other expirations

P1. When the IR1 of the second expiration for the IND expiration to be quoted has a reference price, the corresponding settlement price will be given using equation (3.5) by the sum of (i) the settlement price for the second expiration and (ii) the IR1 reference price:

$$PA_{IND^n} = PA_{IND^2} + PRef_{IR1}^{2.n} \tag{3.5}$$

Where:

PA_{IND^n} = settlement price for the nth IND expiration, rounded to the zero decimal place;

PA_{IND^2} = settlement price for the second IND expiration;

$PRef_{IR1}^{2.n}$ = IR1 reference price from the second to the nth expiration.

P2. When the IR1 of the second expiration for the IND expiration to be quoted has a reference price, the corresponding settlement price will be

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given according to equation (3.6) from (i) the settlement price for the second expiration, (ii) fixed interest rate, and (iii) the implied cost of carry in the settlement prices from the previous business day:

$$PA_{IND^n} = PA_{IND^2} \times \frac{\left(1+\frac{TPre_{DI1}^{INDn}}{100}\right)^{\frac{DU_{INDn}}{252}} \times \left(1+\frac{RPre_{DI1}^{IND2}}{100}\right)^{\frac{-DU_{IND2}}{252}}}{(1+CC_{INDn})^{\frac{DU_{INDn}-DU_{IND2}}{252}}} \tag{3.6}$$

Where:

PA_{IND^n} = settlement price for the nth IND expiration, rounded to the zero decimal place;

PA_{IND^2} = settlement price for the second IND expiration;

$RPre_{DI1}^{INDn}$ = fixed rate for the term of the nth IND expiration calculated by exponential interpolation of DI1 settlement prices according to equation (1.1);

$RPre_{DI1}^{IND2}$ = fixed rate for the term of the second IND expiration calculated by exponential interpolation of DI1 settlement prices according to equation (1.1);

DU_{IND2} = number of trading days between the calculation date and the expiration date of the second IND expiration;

DU_{INDn} = number of trading days between the calculation date and the expiration date of the nth IND expiration;

CC_{INDn} = implied cost of carry in the settlement price for the nth IND expiration on the immediately preceding business day calculated according to equation (3.3).

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From the available Convenience Yield curve, it is possible to find the IND futures prices.

$$PA_{IND^n} = IBV_{LIQ} \times \frac{\left(1+\frac{TPre_{DI1}^{INDn}}{100}\right)^{\frac{DU_{INDn}}{252}}}{\left(1+\frac{CYI_{INDn}}{100}\right)^{\frac{DU_{INDn}}{252}}} \tag{3.7}$$

Where:

PA_{IND^n} = settlement price for the nth IND expiration;

IBV_{LIQ} = settlement price for the Ibovespa expiration;

$RPre_{DI1}^{INDn}$ = fixed rate for the term of the nth IND expiration calculated by exponential interpolation of DI1 settlement prices according to equation (1.1);

DU_{INDn} = number of trading days between the calculation date and the expiration date of the nth IND expiration;

CYI_{INDn} = implied cost of carry in the settlement price for the nth IND expiration on the immediately preceding business day calculated according to equation (3.3), considering the parameters of the immediately preceding business day.

3.1.5 Calculation of settlement index in case of interruption, such as circuit breaker

In case of interruption during settlement index calculation period, a new weight rate will be attributed to published index values after interruption. This way, the weight rate applied in the settlement index calculation becomes the rate between the quantity of publications to be performed and the quantity of remaining publications. The publications to be performed refers to the initial expected

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quantity for the calculation period subtracted from the performed quantity previously from the interruption. The remaining publications refer to the quantity of possible publications to be realized in the negotiation period.

3.2 IBrX-50 Futures (BRI)

The settlement price for the IBrx-50 Futures Contract is expressed as index point values in Brazilian Reals, each point BRL10.00.

BRI settlement prices are calculated using non-arbitrage formulas. The calculation methodology of the first open expiration differs from that of other expirations on expiration date.

3.2.1 All open expirations

The settlement price for all BRI expirations is given by equation (3.8):

$$PA_{BRI^n} = IBrX50_{SET} \times \frac{\left(1+\frac{RPre_{DI1}^{IBrX50n}}{100}\right)^{\frac{DU_{IBrX50n}}{252}}}{\left(1+\frac{CC_{IBrX50}}{100}\right)^{\frac{DU_{IBrX50n}}{252}}} \qquad (3.8)$$

Where:

PA_{BRI^n} =settlement price for the nth BRI expiration, rounded to the zero decimal place;

$IBrX50_{SET}$ = IBrX-50 closing, calculated based on the closing prices of stocks that compose the index portfolio, truncated to the zero decimal place;

$RPre_{DI1}^{IBrX50n}$ = fixed rate for the nth BRI expiration term, calculated using exponential interpolation of DI1 settlement prices according to equation (1.1);

$DU_{IBrX50n}$ = number of trading days between the calculation date and the expiration date of the nth BRI expiration do BRI;

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CC_{IBrX50} = IBrX-50 theoretical portfolio cost of carry calculated using equation (3.9)

$$CC_{IBrX50} = \sum_{j=1}^{na} p_{stock_j} \times \left(\frac{TT_{stock_j} + TD_{stock_j}}{2}\right) \quad (3.9)$$

Where:

CC_{IBrX50} = IBrX-50 theoretical portfolio cost of carry, rounded to the second decimal place;

na = number of stocks in the IBrX-50 theoretical portfolio;

p_{stock_j} = participation percentage of the stock j in the IBrX-50 theoretical portfolio;

TT_{stock_j} = annualized average ask rate (quantity-weighted) of registered stock j loan contracts for all terms and modalities in the three business days prior to the calculation date published by B3;

TD_{stock_j} = annualized average bid rate (quantity-weighted) of the registered j stock loan contracts for all terms and modalities in the three business days prior to the calculation date published by B3.

3.2.2 First open expiration on the last trading day

The settlement price for the first BRI expiration is the Brazil-50 settlement Index calculated using the arithmetic average of the index values published by B3 every 30 seconds in the last three trading hours of the spot market, excluding the closing call.

3.2.3 Calculation of settlement index in case of interruption, such as circuit breaker

In case of interruption during settlement index calculation period, a new weight rate will be attributed to published index values after interruption. This way, the weight rate applied in the settlement index calculation becomes the rate between

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the quantity of publications to be performed and the quantity of remaining publications. The publications to be performed refers to the initial expected quantity for the calculation period subtracted from the performed quantity previously from the interruption. The remaining publications refer to the quantity of possible publications to be realized in the negotiation period.

3.3 S&P 500 Index Futures (ISP) and Micro S&P 500 Futures (WSP)

The settlement price for the **S&P 500 Index Futures** is expressed as index point values in Brazilian Reals, rounded to the second decimal place. WSP settlement prices are the settlement prices of the respective ISP expirations.

ISP settlement prices are calculated from a preferential sequence of procedures. The methodology for calculating the first open expiration differs from the methodology for calculating other expirations on expiration date.

3.3.1 All open expirations

The CME Group reference price for ISP expirations is defined as the price determined from the following preferential procedure sequence carried out after the end of the contract closing call at B3:

a) settlement price for the S&P 500 Futures Contract published by the CME Group.

b) If settlement prices are not available due to holiday in the U.S., the S&P 500 Futures Contract reference price will be the CME Group S&P 500 Futures Contract settlement price from the previous day.

The settlement price resulting from any procedure will satisfy B3 trading platform **valid order** requirements.

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Procedure sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of valid trades (see *General Provisions* section) within the average calculation window according to the parameters shown in Table 4 of the *Monthly Parameters Annex* for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) of the valid bid and asks offers, with valid bid-ask spread, calculated according to the methodology of **VWAP: Volume weighted average price** (see methodology in the **GENERAL PROVISIONS** chapter at the beginning of this manual) for this maturity, observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 4 of the *Monthly Parameters Annex*.

P3. If procedure P1 or P2 cannot be applied, the settlement price will be given by the sum of (i) the CME Group reference price for the expiration in question, (ii) the spread between the prices of the contract traded on the B3 and the CME Group calculated based on the first expiration according to equation (3.10). If the first expiration has no settlement price calculated based on procedure P1 or P2, the spread will be zero. Equation (3.11) presents the calculation of the settlement price by means of procedure P3.

$$Spread_{CME}^{B3} = PA_{ISP^1}^{B3} - Pref_{ISP^1}^{CME} \tag{3.10}$$

Where:

$Spread_{CME}^{B3}$ = spread between contract prices traded at B3 and the CME Group;

$PA_{ISP^1}^{B3}$ = settlement price for the first ISP expiration calculated by B3

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$Pref_{ISP^1}^{CME}$ = CME Group reference price for the first expiration of the S&P 500 Futures Contract.

$$PA_{ISP^n} = Pref_{ISP^n}^{CME} + Spread_{CME}^{B3} \quad (3.11)$$

Where:

PA_{ISP^n} = settlement price for the nth ISP expiration;

$Pref_{ISP^n}^{CME}$ = CME Group reference price for the $n$the expiration of the S&P 500 Futures Contract;

$Spread_{CME}^{B3}$ = spread between contract prices traded at B3 and the CME Group;

In the event the day's CME settlement prices are unavailable due to a public holiday in the United States, attention must be paid to the domestic market, in the case of **invalid orders** during the trading session. In the event of a conflict between the closing price calculated by the P3 procedure and the trading price (s), or between the price (s) of **invalid offers**, during the B3 trading session , the settlement price may be defined at the discretion of B3 in order to adapt to the domestic market, upon approval by the B3 CCP Technical Risk Committee.

3.3.2 First open expiration on the last trading day

The settlement price for the first ISP expiration on the expiration date is the settlement price used by the CME Group for settlement of that expiration. This price can be found at the Bloobmerg terminal under the ticker: SPXSET Index QR. However, B3 will disclose the price only at the close of the day together with the other adjustment prices for other maturities.

On the expiration date, due to the migration of liquidity from the first to the second expiration, the spread between prices of the contract traded at B3 and the CME Group, calculated according to equation (3.10), is calculated using the second expiration.

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3.4 FTSE/JSE Top40 Index Futures (JSE)

The settlement price for the BVMF FTSE/JSE Top40 Futures Contract is expressed in index point values in Brazilian Reals, reported with zero decimal places.

The calculation methodology of the first open expiration differs from other expirations on the expiration date.

3.4.1 All open expirations

The settlement price is the settlement price for the respective expiration of the Top40 FTSE/JSE Futures Index published by the Johannesburg Stock Exchange.

3.4.2 First open expiration on the last trading day

The settlement price for the first JSE expiration on the expiration date is the settlement price for the respective expiration of the Top40 FTSE/JSE Index Futures published by the Johannesburg Stock Exchange.

3.5 Hang Seng Index Futures (HSI)

The settlement price for the BVMF Hang Seng Index Futures Contract is expressed in index points values in Brazilian Reals, reported with zero decimal places.

The calculation methodology of the first open expiration differs from other expirations on the expiration date.

3.5.1 All open expirations

The settlement price is the settlement price for the respective expiration of the BVMF Hang Seng Index Futures published by the Hong Kong Exchanges and Clearing Limited.

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3.5.2 First open expiration on the last trading day

The settlement price for the first HSI expiration on the expiration date is the settlement price for the respective expiration of the BVMF Hang Seng Index Futures published by the Hong Kong Exchanges and Clearing Limited.

3.6 MICEX Index Futures (MIX)

The settlement price for the BVMF MICEX Index Futures Contract is expressed in index point values in Brazilian Reals, reported with zero decimal places.

The calculation methodology of the first open expiration differs from other expirations on the expiration date.

3.6.1 All open expirations

The settlement price is the settlement price for the respective expiration of the BVMF Hang Seng Index Futures published by the MICEX-RTS.

3.6.2 First open expiration on the last trading day

The settlement price for the first MIX expiration on the expiration date is the settlement price for the respective expiration of the BVMF MICEX Index Futures published by the MICEX-RTS.

3.7 S&P Merval Futures (IMV)

The settlement price for the S&P Merval Futures Futures Contract is expressed in index point values in Brazilian Reals, reported with zero decimal places.

IMV settlement prices are calculated from a preferential sequence of procedures. The methodology for calculating the first open expiration differs from the methodology for calculating other expirations on expiration date.

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3.7.1 All open expirations

The BYMA reference price for IMV expirations is defined as the price determined from the following preferential procedure sequence carried out after the end of the contract closing call at B3:

a) Settlement price for the S&P Merval Futures Contract published by BYMA;

b) If settlement prices are not available due to holiday in Argentina, the S&P Merval Futures Contract reference price will be the BYMA S&P Merval Futures Contract settlement price from the previous day.

c) If the settlement prices are not available due to time zone difference, the S&P Merval Futures Contract trade price will be BYMA trading platform price nearest to the end of the IMV closing call at B3.

d) If the trade price on BYMA trading platform nearest to the end of the closing call was before the start of the ISP closing call at B3, the reference price will be the sum of (i) the BYMA Group reference price for the first expiration and (ii) the difference between the settlement prices published by BYMA on the prior business day for the non-trading expiration on the BYMA platform and the first expiration calculated according to equation (3.12)

$$Pref_{IMV^{n},t}^{BYMA} = Pref_{IMV^{1},t}^{BYMA} + \left(PA_{IMV^{n},t-1}^{BYMA} - PA_{IMV^{1},t-1}^{BYMA}\right) \qquad (3.12)$$

Where:

$Pref_{IMV^{n},t}^{BYMA}$ = BYMA reference price for the nth expiration of the S&P Merval Futures Contract on the calculation date t;

$Pref_{IMV^{1},t}^{BYMA}$ = BYMA Group reference price for the first expiration of the S&P Merval Futures Contract on the calculation date t;

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$PA^{BYMA}_{IMV^n,t-1}$ = settlement price for the nth expiration of the S&P Merval Futures Contract published by BYMA on the previous business day to the calculation date (t − 1);

$PA^{BYMA}_{IMV^1,t-1}$ = settlement price for the first expiration of the S&P Merval Futures Contract published by BYMA on the previous business day to the calculation date (t − 1).

The settlement price resulting from any procedure will satisfy B3 trading platform **valid order** requirements.

Procedure sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be the price established at the electronic closing call for the expiration in question.

P2. If procedure P1 cannot be applied, the settlement price will be the average **valid bid prices** and **valid ask prices** with **valid bid-ask spreads** for that expiration as per the parameters stipulated in Table 4 of the Monthly Parameters Annex.

P3. If procedure P1 or P2 cannot be applied, the settlement price will be given by the sum of (i) the BYMA reference price for the expiration in question, (ii) the spread between the prices of the contract traded on the B3 and the BYMA calculated based on the first expiration according to equation (3.13). If the first expiration has no settlement price calculated based on procedure P1 or P2, the spread will be zero. Equation (3.14) presents the calculation of the settlement price by means of procedure P3.

$$Spread^{B3}_{BYMA} = PA^{B3}_{IMV^1} - Pref^{BYMA}_{IMV^1} \quad (3.13)$$

Where:

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$Spread_{BYMA}^{B3}$ = spread between contract prices traded at B3 and the BYMA;

$PA_{IMV^1}^{B3}$ = settlement price for the first IMV expiration calculated by B3;

$Pref_{IMV^1}^{BYMA}$ = BYMA reference price for the first expiration of the S&P Merval Futures Contract.

$$PA_{IMV^n} = Pref_{IMV^n}^{BYMA} + Spread_{BYMA}^{B3} \quad (3.14)$$

Where:

PA_{IMV^n} = settlement price for the nth IMV expiration;

$Pref_{IMV^n}^{BYMA}$ = BYMA reference price for the $n$the expiration of the S&P Merval Futures Contract;

$Spread_{BYMA}^{B3}$ = spread between contract prices traded at B3 and the CME Group;

Settlement prices calculated from the procedures above include rollover trades/offers that meet quantity and exposure time requirements and were executed during the price formation time of the expirations that make up the rollover contract.

In the event the day's BYMA settlement prices are unavailable due to a public holiday in the United States, attention must be paid to the domestic market, in the case of **invalid orders** during the trading session. In the event of a conflict between the closing price calculated by the P3 procedure and the trading price (s), or between the price (s) of **invalid offers**, during the B3 trading session , the settlement price may be defined at the discretion of B3 in order to adapt to the domestic market, upon approval by the B3 CCP Technical Risk Committee.

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3.7.2 First open expiration on the last trading day

The settlement price for the first IMV expiration on the expiration date is the settlement price used by BYMA for settlement of that expiration.

On the expiration date, due to the migration of liquidity from the first to the second expiration, the spread between prices of the contract traded at B3 and BYMA, calculated according to equation (3.13), is calculated using the second expiration.

3.8 Nikkei 225 Futures Contract (INK)

The settlement price for the Nikkei 225 Futures Contract is expressed in index points values in Brazilian Reals, reported with zero decimal places.

INK settlement prices are calculated from a preferential sequence of procedures. The methodology for calculating the first open expiration differs from the methodology for calculating other expirations on expiration date.

3.8.1 All open expirations

The TSE reference price for INK expirations is defined as the price determined from the following preferential procedures sequence carried out after the end of the contract closing call at B3:

a) settlement price for the Nikkei 225 Futures Contract published by the TSE;

b) If settlement prices are not available due to holiday in Japan or USA, the INK reference price will be the Nikkei 225 Futures Contract settlement price from the previous day as published by the TSE.

c) If the settlement prices are not available due to time zone difference, the Nikkei 225 Futures Contract trade price will be the TSE trading platform price nearest to the end of the INK closing call at B3.

d) If the trade price on the TSE trading platform nearest to the end of the closing call was before the start of the INK closing call at B3, the reference

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price will be the sum of (i) the CME Group reference price for the first expiration and (ii) the difference between the settlement prices published by CME Group on the previous business day for the non-trading expiration on the CME Group platform and the first expiration calculated according to equation (3.15)

$$Pref_{INK^n,t}^{TSE} = Pref_{INK^1,t}^{TSE} + \left(PA_{INK^n,t-1}^{TSE} - PA_{INK^1,t-1}^{TSE}\right) \qquad (3.15)$$

Where:

$Pref_{INK^n,t}^{TSE}$ = TSE reference price for the nth expiration of the or the nth expiration of the Nikkei 225 Futures Contract on the calculation date t;

$Pref_{INK^1,t}^{TSE}$ = TSE reference price for the first expiration of the Nikkei 225 Futures Contract on the calculation date t;

$PA_{INK^n,t-1}^{TSE}$ = settlement price for the nth expiration of the Nikkei 225 Futures Contract published by the TSE on the business day prior to the calculation date $(t - 1)$;

$PA_{INK^1,t-1}^{TSE}$ = settlement price for the first expiration of the Nikkei 225 Futures Contract published by the TSE on the business day prior to the calculation date $(t - 1)$.

The settlement price resulting from any procedure will satisfy B3 trading platform **valid order** requirements.

Procedure sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be the price established at the electronic closing call for the expiration in question.

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P2. If procedure P1 cannot be applied, the settlement price will be the average **valid bid prices** and **valid ask prices** with **valid bid-ask spreads** for that expiration as per the parameters stipulated in Table 4 of the Monthly Parameters Annex.

P3. If procedure P1 or P2 cannot be applied, the settlement price will be given by the sum of (i) the TSE reference price for the expiration in question, (ii) the spread between the prices of the contract traded on the B3 and the TSE calculated based on the first expiration according to equation (3.16). If the first expiration has no settlement price calculated based on procedure P1 or P2, the spread will be zero. Equation (3.17) presents the calculation of the settlement price by means of procedure P3.

$$Spread_{TSE}^{B3} = PA_{INK^1}^{B3} - Pref_{INK^1}^{TSE} \tag{3.16}$$

Where:

$Spread_{TSE}^{B3}$ = spread between contract prices traded at B3 and the TSE;

$PA_{INK^1}^{B3}$ =settlement price for the first INK expiration calculated by B3;

$Pref_{INK^1}^{TSE}$ = TSE reference price for the first expiration of the Nikkei 225 Futures Contract.

$$PA_{INK^n} = Pref_{INK^n}^{TSE} + Spread_{TSE}^{B3} \tag{3.17}$$

Where:

PA_{INK^n} = settlement price for the nth INK expiration;

$Pref_{INK^n}^{TSE}$ = TSE reference price for the n expiration of the Nikkei 225 Futures Contract;

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$Spread_{TSE}^{B3}$ = spread between contract prices traded at B3 and the CME TSE;

Settlement prices calculated from the procedures above include rollover trades/offers that meet quantity and exposure time requirements and were executed during the price formation time of the expirations that make up the rollover contract.

In the event the day's settlement prices are unavailable due to a public holiday in Japan or USA, attention must be paid to the domestic market, in the case of **invalid orders** during the trading session. In the event of a conflict between the closing price calculated by the P3 procedure and the trading price (s), or between the price (s) of **invalid offers**, during the B3 trading session, the settlement price may be defined at the discretion of B3 in order to adapt to the domestic market, upon approval by the B3 CCP Technical Risk Committee.

3.8.2 First open expiration on the last trading day

The settlement price for the first INK expiration on the expiration date is the settlement price used by the TSE for settlement of that expiration.

On the expiration date, due to the migration of liquidity from the first to the second expiration, the spread between prices of the contract traded at B3 and the TSE, calculated according to equation (3.16), is calculated using the second expiration.

3.9 Stock and ETFs Futures

The settlement price for the Stock Futures Contract is expressed in Brazilian Reals per share. The price is disclosed to Two decimal places, rounded to the second decimal place.

3.9.1 All open expirations

Procedure sequence to determine the settlement price for a given expiration of the contract

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The procedure for determining the settlement price for a given expiration of the contract is a non-arbitrage relationship between (i) the closing price of the stock, (ii) interest rate and (iii) the average rate of stoke rental for the day.

The settlement price will calculated as follows

$$PA_n = S(t) \cdot \frac{(1 + r_n)^{\frac{DU_n}{252}}}{(1 + c_n^{PA})^{\frac{DU_n}{252}}} \tag{3.18}$$

Where:

PA_n =settlement price for the nth expiration, rounded to the second decimal place;

$S(t)$ = Stock closing price

DU_n= Business days until the expiration date

r_n= fixed interest rate calculated using daily settlement price of the DI1 future;

c_n^{PA}= average rental cost of the underlying stock in the BTB system on calculation day considering the trades and renewals carried out up to the time of calculation;

3.9.2 First open expiration on the last trading day

On the expiration date, the settlement price will be the closing price of the underlying share of the futures contract.

3.9.3 Adjusted settlement price

The value of the daily adjustment to financial settlement is calculate as the difference of day price and prior business day. If a corporate event occurs on the underlying share of the future contract, the settlement price will be adjusted.

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$$DailySettlValue(t) = PA(t) - PA_{Aj}(t-1)$$

Where:

$DailySettlValue(t)$ = the value of the daily adjustment to financial settlement when there is a corporate event on the stock or not;

$PA(t)$ = settlement price on date *t*, for the respective expiration;

$PA_{Aj}(t-1)$ = settlement price on the prior business day, adjusted according to the corporate event, if necessary.

The adjustment made to the settlement price and to the future contract position, when applicable, as per the corporate event, is described in The B3 Operating Procedures Manual, available on the B3 website, in the Regulation, Regulations and Manuals, Clearing, settlement, and risk management.

3.10 DAX Futures Contract (DAX)

The settlement price for the DAX Futures Contract is expressed in index points values in Brazilian Reals, reported with zero decimal places.

DAX settlement prices are calculated from a preferential sequence of procedures. The methodology for calculating the first open expiration differs from the methodology for calculating other expirations on expiration date.

3.10.1 All open expirations

The Eurex reference price for DAX expirations is defined as the price determined from the following preferential procedure sequence carried out after the end of the contract closing call at B3:

a) settlement price for the DAX Futures Contract published by the Eurex;

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b) If settlement prices are not available due to holiday in the trading location, the DAX reference price will be the DAX Futures Contract settlement price from the previous day as published by the Eurex.

c) If the settlement prices are not available due to time zone difference, the DAX Futures Contract trade price will be the Eurex trading platform price nearest to the end of the DAX closing call at B3.

d) If the trade price on the Eurex trading platform nearest to the end of the closing call was before the start of the DAX closing call at B3, the reference price will be the sum of (i) the Eurex reference price for the first expiration and (ii) the difference between the settlement prices published by Eurex on the previous business day for the non-trading expiration on the Eurex platform and the first expiration calculated according to equation (3.19)

$$Pref_{DAX^n,t}^{Eurex} = Pref_{DAX^1,t}^{Eurex} + \left(PA_{DAX^n,t-1}^{Eurex} - PA_{DAX^1,t-1}^{Eurex}\right) \qquad (3.19)$$

Where:

$Pref_{DAX^n,t}^{Eurex}$ = Eurex reference price for the nth expiration of the or the nth expiration of the DAX Futures Contract on the calculation date t;

$Pref_{DAX^1,t}^{Eurex}$ = Eurex reference price for the first expiration of the DAX Futures Contract on the calculation date t;

$PA_{DAX^n,t-1}^{Eurex}$ = settlement price for the nth expiration of the DAX Futures Contract published by the Eurex on the business day prior to the calculation date $(t - 1)$;

$PA_{DAX^1,t-1}^{Eurex}$ = settlement price for the first expiration of the DAX Futures Contract published by the Eurex on the business day prior to the calculation date $(t - 1)$.

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The settlement price resulting from any procedure will satisfy B3 trading platform **valid order** requirements.

Procedure sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be the price established at the electronic closing call for the expiration in question.

P2. If procedure P1 cannot be applied, the settlement price will be the average **valid bid prices** and **valid ask prices** with **valid bid-ask spreads** for that expiration as per the parameters stipulated in Table 4 of the Monthly Parameters Annex.

P3. If procedure P1 or P2 cannot be applied, the settlement price will be given by the sum of (i) the Eurex reference price for the expiration in question, (ii) the spread between the prices of the contract traded on the B3 and the Eurex calculated based on the first expiration according to equation (3.20). If the first expiration has no settlement price calculated based on procedure P1 or P2, the spread will be zero. Equation (3.21) presents the calculation of the settlement price by means of procedure P3.

$$Spread_{Eurex}^{B3} = PA_{DAX^1}^{B3} - Pref_{DAX^1}^{Eurex} \quad (3.20)$$

Where:

$Spread_{Eurex}^{B3}$ = spread between contract prices traded at B3 and the Eurex;

$PA_{DAX^1}^{B3}$ =settlement price for the first DAX expiration calculated by B3;

$Pref_{DAX^1}^{TSE}$ = Eurex reference price for the first expiration of the DAX Futures Contract.

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$$PA_{DAX^n} = Pref_{DAX^n}^{Eurex} + Spread_{Eurex}^{B3} \quad (3.21)$$

Where:

PA_{DAX^n} = settlement price for the nth DAX expiration;

$Pref_{DAX^n}^{Eurex}$ = Eurex reference price for the $n$the expiration of the DAX Futures Contract;

$Spread_{Eurex}^{B3}$ = spread between contract prices traded at B3 and the Eurex;

Settlement prices calculated from the procedures above include rollover trades/offers that meet quantity and exposure time requirements and were executed during the price formation time of the expirations that make up the rollover contract.

In the event the day's settlement prices are unavailable due to a public holiday trading location, attention must be paid to the domestic market, in the case of **invalid orders** during the trading session. In the event of a conflict between the closing price calculated by the P3 procedure and the trading price (s), or between the price (s) of **invalid offers**, during the B3 trading session , the settlement price may be defined at the discretion of B3 in order to adapt to the domestic market, upon approval by the B3 CCP Technical Risk Committee.

3.10.2 First open expiration on the last trading day

The settlement price for the first DAX expiration on the expiration date is the settlement price used by the Eurex for settlement of that expiration.

On the expiration date, due to the migration of liquidity from the first to the second expiration, the spread between prices of the contract traded at B3 and the Eurex, calculated according to equation (3.20), is calculated using the second expiration.

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3.11 Euro Stoxx 50 Futures Contract (ESX)

The settlement price for the ESX Futures Contract is expressed in index points values in Brazilian Reals, reported with zero decimal places.

ESX settlement prices are calculated from a preferential sequence of procedures. The methodology for calculating the first open expiration differs from the methodology for calculating other expirations on expiration date.

3.11.1 All open expirations

The Eurex reference price for ESX expirations is defined as the price determined from the following preferential procedure sequence carried out after the end of the contract closing call at B3:

a) settlement price for the ESX Futures Contract published by the Eurex;

b) If settlement prices are not available due to holiday in the trading location, the ESX reference price will be the ESX Futures Contract settlement price from the previous day as published by the Eurex.

c) If the settlement prices are not available due to time zone difference, the ESX Futures Contract trade price will be the Eurex trading platform price nearest to the end of the ESX closing call at B3.

d) If the trade price on the Eurex trading platform nearest to the end of the closing call was before the start of the ESX closing call at B3, the reference price will be the sum of (i) the Eurex reference price for the first expiration and (ii) the difference between the settlement prices published by Eurex on the previous business day for the non-trading expiration on the Eurex platform and the first expiration calculated according to equation (3.22)

$$Pref_{ESX^n,t}^{Eurex} = Pref_{ESX^1,t}^{Eurex} + \left(PA_{ESX^n,t-1}^{Eurex} - PA_{ESX^1,t-1}^{Eurex}\right) \qquad (3.22)$$

Where:

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$Pref_{ESX^n,t}^{Eurex}$ = Eurex reference price for the nth expiration of the or the nth expiration of the ESX Futures Contract on the calculation date t;

$Pref_{ESX^1,t}^{Eurex}$ = Eurex reference price for the first expiration of the ESX Futures Contract on the calculation date t;

$PA_{ESX^n,t-1}^{Eurex}$ = settlement price for the nth expiration of the ESX Futures Contract published by the Eurex on the business day prior to the calculation date $(t-1)$;

$PA_{ESX^1,t-1}^{Eurex}$ = settlement price for the first expiration of the ESX Futures Contract published by the Eurex on the business day prior to the calculation date $(t-1)$.

The settlement price resulting from any procedure will satisfy B3 trading platform **valid order** requirements.

Procedure sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be the price established at the electronic closing call for the expiration in question.

P2. If procedure P1 cannot be applied, the settlement price will be the average **valid bid prices** and **valid ask prices** with **valid bid-ask spreads** for that expiration as per the parameters stipulated in Table 4 of the Monthly Parameters Annex.

P3. If procedure P1 or P2 cannot be applied, the settlement price will be given by the sum of (i) the Eurex reference price for the expiration in question, (ii) the spread between the prices of the contract traded on the B3 and the Eurex calculated based on the first expiration according to equation (3.23). If the first expiration has no settlement price calculated based on procedure P1 or P2, the

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spread will be zero. Equation (3.24) presents the calculation of the settlement price by means of procedure P3.

$$Spread_{Eurex}^{B3} = PA_{ESX^1}^{B3} - Pref_{ESX^1}^{Eurex} \quad (3.23)$$

Where:

$Spread_{Eurex}^{B3}$ = spread between contract prices traded at B3 and the Eurex;

$PA_{ESX^1}^{B3}$ =settlement price for the first ESX expiration calculated by B3;

$Pref_{ESX^1}^{TSE}$ = Eurex reference price for the first expiration of the ESX Futures Contract.

$$PA_{ESX^n} = Pref_{ESX^n}^{Eurex} + Spread_{Eurex}^{B3} \quad (3.24)$$

Where:

PA_{ESX^n} = settlement price for the nth ESX expiration;

$Pref_{ESX^n}^{Eurex}$ = Eurex reference price for the $n$the expiration of the ESX Futures Contract;

$Spread_{Eurex}^{B3}$ = spread between contract prices traded at B3 and the Eurex;

Settlement prices calculated from the procedures above include rollover trades/offers that meet quantity and exposure time requirements and were executed during the price formation time of the expirations that make up the rollover contract.

In the event the day's settlement prices are unavailable due to a public holiday trading location, attention must be paid to the domestic market, in the case of **invalid orders** during the trading session. In the event of a conflict between the closing price calculated by the P3 procedure and the trading price (s), or between

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the price (s) of **invalid offers**, during the B3 trading session , the settlement price may be defined at the discretion of B3 in order to adapt to the domestic market, upon approval by the B3 CCP Technical Risk Committee.

3.10.2 First open expiration on the last trading day

The settlement price for the first ESX expiration on the expiration date is the settlement price used by the Eurex for settlement of that expiration.

On the expiration date, due to the migration of liquidity from the first to the second expiration, the spread between prices of the contract traded at B3 and the Eurex, calculated according to equation (3.23), is calculated using the second expiration.

3.12 Real Estate Investment Fund Index Futures (XFI)

The settlement price for the Real Estate Investment Fund Index Futures Contract (XFI) is expressed as index point.

3.12.1 All open expirations

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of **valid trades** (see General Provisions section) within the **average calculation window** according to the parameters shown in Table 10 of the Monthly Parameters Annex for the afore mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average **valid bid** prices and **valid ask** prices with **valid bid-ask spreads** for that expiration as per the parameters stipulated in Table 10 of the Monthly Parameters Annex.

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be defined according to the equation (3.25).

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$$PA_{XFI^n,t} = PA_{XFI^n,t-1} \times Spread \quad (3.25)$$

Where:

$PA_{XFI^n,t}$ = settlement price for the nth FXI expiration in trading session t;

$PA_{XFI^n,t-1}$ = settlement price for the nth FXI expiration in trading session t-1;

$Spread$ = determined by one of the methods (P3.1 or P3.2) below:

P3.1 If there is at least one expiration j with settlement price determined by P1 or P2 procedure, the spread used in the remaining n expiration will be defined according to the equation (3.26).

$$Spread = \sum_{j=1}^{k} \frac{Spread_j}{k} \quad (3.26)$$

Where:

k = quantity of expiration with settlement price determined by P1 or P2 procedure;

$Spread_j = \frac{PA_{FXI^n_{,t}}}{PA_{FXI^n_{,t-1}}}$, ratio between settlement price for the nth FXI expiration in trading sessions t and t-1.

P3.2 If none of the n expiration is determined by procedure P1 or P2, the Spread is determined by the IFIX index ratio according to the equation 3.27.

$$\text{Spread} = \frac{\text{IFIX}_t}{\text{IFIX}_{t-1}} \quad (3.27)$$

Where:

$IFIX_t$ = closing price for the IFIX indicator in the trading session t.

P4.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a

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settlement price defined by P1 or P2 and a following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.1 in the B3 Curves Manual.

P4.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and no following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.8 in the B3 Curves Manual.

3.12.2 First open expiration on the last trading day

The settlement price for the first XFI expiration is the Real Estate Investment Fund settlement index calculated using the arithmetic average of the index values published by B3 every 30 seconds in the last three trading hours of the spot market, excluding the closing call.

3.13 Small Caps Index Futures (SML)

The settlement price for the Small Caps Index Futures Contract (SML) is expressed in Brazilian reais per index points to 2 decimal places.

3.13.1 All open expirations

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of **valid trades** (see General Provisions section) within the **average calculation window** according to the parameters shown in Table 11 of the Monthly Parameters Annex for the afore mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) of the valid bid and asks offers, with

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valid bid-ask spread, calculated according to the methodology of **VWAP: Volume weighted average price** (see methodology in the **GENERAL PROVISIONS** chapter at the beginning of this manual) for this maturity, observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 11 of the *Monthly Parameters Annex*.

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be defined according to the equation (3.28).

$$PA_{SML^n,t} = PA_{SML^n,t-1} \times Spread \quad (3.28)$$

Where:

$PA_{SML^n,t}$ = settlement price for the nth SML expiration in trading session t;

$PA_{SML^n,t-1}$ = settlement price for the nth SML expiration in trading session t-1;

$Spread$ = determined by one of the methods (P3.1 or P3.2) below:

P3.1 If there is at least one expiration j with settlement price determined by P1 or P2 procedure, the spread used in the remaining n expiration will be defined according to the equation (3.29).

$$Spread = \sum_{j=1}^{k} \frac{Spread_j}{k} \quad (3.29)$$

Where:

k = quantity of expiration with settlement price determined by P1 or P2 procedure;

$Spread_j = \frac{PA_{SML_t^n}}{PA_{SML_{t-1}^n}}$, ratio between settlement price for the nth SML expiration in trading sessions t and $t-1$.

P3.2 If there are no expiration determined by procedure P1 or P2, the Spread is determined by the SML index ratio according to equation 3.30.

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$$\text{Spread} = \frac{\text{SML}_t}{\text{SML}_{t-1}} \tag{3.30}$$

Where:

SML_t = closing price for SML indicator in Brazilian Reais in the trading session t;

SML_{t-1} = closing price for SML indicator in Brazilian Reais in the trading session t-1.

P4.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and a following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.1 in the B3 Curves Manual.

P4.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and no following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the extrapolation flat, given in the Section 1.4.8 in the B3 Curves Manual.

3.13.2 First open expiration on the last trading day

The settlement price for the first SML expiration is the Small Caps index settlement indicator calculated using the arithmetic average of the index values published by B3 every 30 seconds in the last three trading hours of the spot market, excluding the closing call

3.14 Bovespa B3 BR+ Index Futures (MBR)

The settlement price for the Bovespa B3 BR+ Index Futures Contract (IBBR) is expressed in Brazilian reais per index points to 2 decimal places.

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3.14.1 All open expirations

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of **valid trades** (see General Provisions section) within the **average calculation window** according to the parameters shown in Table 11 of the Monthly Parameters Annex for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) of the valid bid and asks offers, with valid bid-ask spread, calculated according to the methodology of **VWAP: Volume weighted average price** (see methodology in the **GENERAL PROVISIONS** chapter at the beginning of this manual) for this maturity, observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 11 of the *Monthly Parameters Annex*.

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be defined according to the equation (3.31).

$$PA_{MBR^n,t} = PA_{MBR^n,t-1} \times Spread \qquad (3.31)$$

Where:

$PA_{MBR^n,t}$ = settlement price for the nth MBR expiration in trading session t;

$PA_{MBR^n,t-1}$ = settlement price for the nth MBR expiration in trading session t-1;

$Spread$ = determined by one of the methods (P3.1 or P3.2) below:

P3.1 If there is at least one expiration j with settlement price determined by P1 or P2 procedure, the spread used in the remaining n expiration will be defined according to the equation (3.32).

$$Spread = \sum_{j=1}^{k} \frac{Spread_j}{k} \qquad (3.32)$$

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Where:

k = quantity of expiration with settlement price determined by P1 or P2 procedure.

$Spread_j = \frac{PA_{MBR_{,t}^n}}{PA_{MBR_{,t-1}^n}}$, ratio between settlement price for the nth MBR expiration in trading sessions t and $t-1$.

P3.2 If there are no expiration determined by procedure P1 or P2, the Spread is determined by the IBBR index ratio according to equation 3.33.

$$\text{Spread} = \frac{\text{IBBR}_t}{\text{IBBR}_{t-1}} \tag{3.33}$$

Where:

$IBBR_t$ = closing price for IBBR indicator in Brazilian Reais in the trading session t;

$IBBR_{t-1}$ = closing price for IBBR indicator in Brazilian Reais in the trading session t-1.

P4.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and a following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.5 in the B3 Curves Manual.

P4.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and no following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the extrapolation flat, given in the Section 1.4.8 in the B3 Curves Manual.

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3.14.2 First open expiration on the last trading day

The settlement price for the first MBR expiration is the IBBR index settlement indicator calculated using the arithmetic average of the index values published by B3 every 30 seconds in the last three trading hours of the spot market, excluding the closing call.

3.15 S&P/B3 Bovespa VIX Index Futures (VIX)

The settlement price for the S&P/B3 Bovespa VIX Index Futures Contract (VIX) is expressed in Brazilian reais per index points to 2 decimal places.

3.15.1 All open expirations

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of **valid trades** (see General Provisions section) within the **average calculation window** according to the parameters shown in Table 11 of the Monthly Parameters Annex for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) of the valid bid and asks offers, with valid bid-ask spread, calculated according to the methodology of **VWAP: Volume weighted average price** (see methodology in the **GENERAL PROVISIONS** chapter at the beginning of this manual) for this maturity, observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 11 of the *Monthly Parameters Annex*.

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be defined according to the equation (3.31).

$$PA_{VIX^n,t} = PA_{VIX^n,t-1} \times Spread \tag{3.34}$$

Where:

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$PA_{VIX^n,t}$ = settlement price for the nth VIX expiration in trading session t;

$PA_{VIX^n,t-1}$ = settlement price for the nth VIX expiration in trading session t-1;

$Spread$ = determined by one of the methods (P3.1 or P3.2) below:

P3.1 If there is at least one expiration j with settlement price determined by P1 or P2 procedure, the spread used in the remaining n expiration will be defined according to the equation (3.35).

$$Spread = \sum_{j=1}^{k} \frac{Spread_j}{k} \tag{3.35}$$

Where:

k = quantity of expiration with settlement price determined by P1 or P2 procedure.

$Spread_j = \frac{PA_{VIX_{,t}^n}}{PA_{VIX_{,t-1}^n}}$, ratio between settlement price for the nth VIX expiration in trading sessions t and $t-1$.

P3.2 If there are no expiration determined by procedure P1 or P2, the Spread is determined by the VXBR index ratio according to equation 3.36.

$$\text{Spread} = \frac{\text{VXBR}_t}{\text{VXBR}_{t-1}} \tag{3.36}$$

Where:

$VXBR_t$ = closing price for VXBR indicator in Brazilian Reais in the trading session t;

$VXBR_{t-1}$ = closing price for VXBR indicator in Brazilian Reais in the trading session t-1.

P4.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a

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settlement price defined by P1 or P2 and a following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.5 in the B3 Curves Manual.

P4.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and no following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the extrapolation flat, given in the Section 1.4.8 in the B3 Curves Manual.

3.14.2 First open expiration on the last trading day

The settlement price for the first VIX expiration is the VXBR index settlement indicator calculated using the arithmetic average of the index values published by B3 every 15 seconds in the last three trading hours of the spot market, excluding the closing call.

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4 COMMODITIES

The procedures for calculating settlement prices for commodities futures contracts are defined below. The settlement price resulting from any procedure must respect the **valid orders.**

4.1 Cash Settled Live Cattle Futures Contract (BGI)

The settlement price for the Cash Settled Live Cattle Futures Contract (BGI) is expressed in Brazilian Reals per 330 arrobas (about 10.7 thousand pounds), to two decimal places rounded to the second decimal place.

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of indirect (distinct intermediaries) **valid trades** within the **average calculation window** according to the parameters shown in Table 6 of the Monthly Parameters Annex for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) calculated according to the methodology of **VWAP** (see methodology in the **GENERAL PROVISIONS, Market Pricing, (iv) VWAP**) with books checked every 1 second, and observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 6 of the *Monthly Parameters Annex*.

P3. If the P2 procedure cannot be applied, the settlement price for the maturity in question will be determined as follows, for each maturity (equation 4.1):

1. identify, into the season or off-season group to the corresponding maturity to be calculated (n), the maturities whose pricing will be determined by the P1 or P2 procedures;

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2. between these maturities, identify the maturity with the greatest liquidity (key), that is, the maturity with most open contracts in the previous trading day;
3. for this maturity (key), the additive variation will be calculated, between the previous trading date settlement price ($SP_{BGI,t-1}^{key}$) and the current trading date settlement price ($SP_{BGI,t}^{key}$);
4. then the additive variation is applied to the previous day settlement price, of the maturity to be priced ($SP_{BGI,t-1}^{n}$).

If two or more maturities have the same number of open contracts, the maturity with the shortest term in business days between the maturity date of this one and the calculation date (t) will be used. The season or off-season groups are defined annually and follow the distribution in Table 7 of the Monthly Parameters Annex.

$$SP_{BGI,t}^{n} = SP_{BGI,t-1}^{n} + \left(SP_{BGI,t}^{key} - SP_{BGI,t-1}^{key}\right) \tag{4.1}$$

Where:

$SP_{BGI,t}^{n}$ = settlement price for the n-th BGI expiration on trading session t .

$SP_{BGI,t-1}^{n}$ = settlement price for the n-th BGI expiration on trading session $t-1$.

$SP_{BGI,t}^{key}$ = settlement price for the key BGI expiration on trading session t.

$SP_{BGI,t-1}^{key}$ = settlement price for the key BGI expiration on trading session $t-1$.

P4. If there is no maturity determined by P1 or P2 in the *n* maturity block in question, the key maturity will be determined as follows, for each maturity:

1. identify, between the other blocks, the respective key maturity (according to the items 1 and 2 from procedure P3);

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2. from these keys maturities, the period in working days between the maturity n and each key maturity day is calculated;
3. the key used in P4 procedure is the shortest period. This will be used in the same equation as the P3 procedure (equation 4.1).

If two due dates have the same number of periods, the key maturity will be the closest to the due date.

P5. If there are no expiration determined by P1 or P2, the settlement price will be the settlement price from the previous trading session, according to equation (4.2):

$$\mathrm{SP}_{BGI,t}^{n} = \mathrm{SP}_{BGI,\mathrm{t}-1}^{n} \tag{4.2}$$

P6.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and a following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.5 in the B3 Curves Manual.

P6.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (a) with a settlement price defined by P1 or P2 and no following expiration (p) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the extrapolation flat, given in the Section 1.4.8 in the B3 Curves Manual.

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4.2 4/5 Arabica Coffee Futures (ICF)

The settlement price for the 4/5 Arabica Coffee Futures Contract is expressed in U.S. Dollars per 100 bags, to two decimal places rounded to the second decimal place.

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of indirect (distinct intermediaries) **valid trades** within the **average calculation window** according to the parameters shown in Table 6 of the Monthly Parameters Annex for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) calculated according to the methodology of **VWAP** (see methodology in the **GENERAL PROVISIONS, Market Pricing, (iv) VWAP**) with books checked every 1 second, and observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 6 of the *Monthly Parameters Annex*. If the expiration in question doesn't have a valid mid, the settlement price for it will be:

P2.1. Price determined from structured Arabica Coffee rollover (CR1) transactions carried out throughout the day, provided that the short or long leg carry settlement prices determined from the trades (P1) or average valid bid-ask prices (P2). The settlement price will be calculated from equation (4.3) if the expiration to be calculated is the long leg or (4.4) if the expiration to be calculated is the short leg.

$$PA_{ICF^n} = PA_{ICF^c} + CR1 \tag{4.3}$$

$$PA_{ICF^n} = PA_{ICF^l} - CR1 \tag{4.4}$$

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Where:

PA_{ICF^n} = settlement price for the nth ICF expiration;

PA_{ICF^c} = settlement price for the short leg of the structured rollover transaction;

PA_{ICF^l} = settlement price for the long leg of the structured rollover transaction;

$CR1$ = average price of the structured rollover transactions weighted by the traded quantity. Direct trades (same intermediary) are not considered;

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be calculated according to equation (4.5).

$$PA_{ICF^n} = PA_{KC^n} \times Factor_{conv} + Spread_{ICF^n}^{KC^n} \quad (4.5)$$

Where:

PA_{ICF^n} = settlement price for the nth ICF expiration, rounded to the second decimal place;

PA_{KC^n} = settlement price for the Coffee "C" Futures Contract (KC) traded on the Intercontinental Exchange (ICE) with the same ICF expiration;

$Factor_{conv}$ = KC price conversion factor for the ICF quotation unit equal to 1.3228;

$Spread_{ICF^n}^{KC^n}$ = spread between the coffee futures contract prices for the B3 ICF expiration and the ICE KC expiration, calculated based on the previous day's settlement price according to equation (4.6), rounded to the second decimal place;

$$Spread_{ICF^n}^{KC^n} = PA_{t-1,ICF^n} - PA_{t-1,KC^n} \times Factor_{conv} \quad (4.6)$$

Where:

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PA_{t-1,ICF^n} = settlement price for the nth ICF expiration calculated on the previous business day;

PA_{t-1,KC^n} = settlement price for the nth KC expiration published on the previous business day;

4.3 Cash Settled Hydrous Ethanol Futures Contract (ETH)

The settlement price for the Cash Settled Hydrous Ethanol Futures Contract is expressed in Brazilian Reals per 30 cubic meters, to two decimal places rounded to the second decimal place.

Procedure sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of indirect (distinct intermediaries) **valid trades** within the **average calculation window** according to the parameters shown in Table 6 of the Monthly Parameters Annex for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) calculated according to the methodology of **VWAP** (see methodology in the **GENERAL PROVISIONS, Market Pricing, (iv) VWAP**) with books checked every 1 second, and observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 6 of the *Monthly Parameters Annex*.

P3. If it is not possible to apply the previous procedures (1 and 2), the settlement price will be determined by applying the daily percentagem spread below:

$$SP_{ETH^n,t} = SP_{ETH^n,t-1} \times Spread \tag{4.7}$$

Where:

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$\boldsymbol{SP_{ETH^n,t}}$ is the futures contract settlement price for nth expiration on t date;

$\boldsymbol{SP_{ETH^n,t-1}}$ is the futures contract settlement price for nth expiration on $t-1$ date;

$\boldsymbol{Spread}$ is the spread calculated based on one of the methods described below (3.1 or 3.2).

P3.1 Caso If there i sat least one j expiration on on t date with a settlement price determined by procedures 1 or 2, the spread will be obtained by averaging the spreads for each expiration, according to equation (4.8):

$$Spread = \sum_{j=1}^{k} \frac{Spread_j}{k} \tag{4.8}$$

Where:

$Spread_j = \frac{SP_{ETH^j,t}}{SP_{ETH^j,t-1}}$ is the ratio between the settlement price of the jnth expiration calculatedby P1 or P2 and its respective settlement price in $t-1$;

k: is the total number of expirations adjusted by procedures 1 or 2 for the product on t.

P3.2 If no $SP_{ETH^j,t}$ expiration is calculated by procedures 1 or 2, the ratio of the Hydrous Ethanol ESALQ/BM&F Posto Paulínia (SP) spot index will be used, expressed in Brazilian Reals per m^3, source CEPEA/ESALQ, as follows:

$$Spread = \frac{Index_{t-1}}{Index_{t-2}} \tag{4.9}$$

Where:

$\boldsymbol{Index_{t-1}}$ is the Hydrous Ethanol CEPEA/ESALQ index for the $t-1$ date;

$\boldsymbol{Index_{t-2}}$ is the Hydrous Ethanol CEPEA/ESALQ index for the $t-2$ date.

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P4.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and a following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.1 in the B3 Curves Manual.

P4.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and no following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the extrapolation flat, given in the Section 1.4.8 in the B3 Curves Manual.

4.4 Cash Settled Corn Futures Contract (CCM)

The settlement price for the Cash Settled Corn Futures Contract is expressed in Brazilian Reals per 450 bags of 60 net kilograms, to two decimal places rounded to the second decimal place.

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of indirect (distinct intermediaries) **valid trades** within the **average calculation window** according to the parameters shown in Table 6 of the Monthly Parameters Annex for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) calculated according to the methodology of **VWAP** (see methodology in the **GENERAL PROVISIONS, Market Pricing, (iv) VWAP**) with books checked every 1 second, and observing the **Quantity**

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Limit and **Spread Limit** parameters stipulated in Table 6 of the *Monthly Parameters Annex*.

P3. If the P2 procedure cannot be applied, the settlement price for the maturity in question will be determined as follows, for each maturity (equation 4.10):

1. identify, into the season or off-season group to the corresponding maturity to be calculated (n), the maturities whose pricing will be determined by the P1 or P2 procedures;
2. between these maturities, verify the maturity with the greatest liquidity (key), that is, the maturity with most open contracts in the previous trading day;
3. for this maturity (key), the additive variation will be calculated, between the previous trading date settlement price ($SP^{key}_{CCM,t-1}$) and the current trading date settlement price ($SP^{key}_{CCM,t}$);
4. then the additive variation is applied to the previous day settlement price, of the maturity to be priced ($SP^{n}_{CCM,t-1}$).

If two or more maturities have the same number of open contracts, the maturity with the shortest term in business days between the maturity date of this one and the calculation date (t) will be used. The season or off-season groups are defined annually and follow the distribution in Table 7 of the Monthly Parameters Annex.

$$SP^{n}_{CCM,t} = SP^{n}_{CCM,t-1} + \left(SP^{key}_{CCM,t} - SP^{key}_{CCM,t-1}\right) \tag{4.10}$$

Where:

$SP^{n}_{CCM,t}$ = settlement price for the n-th CCM expiration on trading session t .

$SP^{n}_{CCM,t-1}$ = settlement price for the n-th CCM expiration on trading session $t-1$.

$SP^{key}_{CCM,t}$ = settlement price for the key CCM expiration on trading session t.

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$SP_{CCM,t-1}^{key}$ = settlement price for the key CCM expiration on trading session $t-1$.

P4. If there is no maturity determined by P1 or P2 in the *n* maturity block in question, the key maturity will be determined as follows, for each maturity:

1. identify, between the other blocks, the respective key maturity (according to the items 1 and 2 from procedure P3);
2. from these keys maturities, the period in working days between the maturity n and each key maturity day is calculated;
3. the key used in P4 procedure is the shortest period. This will be used in the same equation as the P3 procedure (equation 4.10).

If two due dates have the same number of period, the key maturity will be the closest to the due date.

P5. If there are no expiration determined by P1 or P2, the settlement price will be the settlement price from the previous trading session, according to equation (4.11):

$$\mathrm{SP}_{CCM,t}^{n} = \mathrm{SP}_{CCM,\mathrm{t-1}}^{n} \tag{4.11}$$

P6.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and a following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.5 in the B3 Curves Manual.

P6.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (a) with a settlement price defined by P1 or P2 and no following expiration (p) with a settlement price defined by P1 or P2, the settlement price of contract n will be

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defined by the extrapolation flat, given in the Section 1.4.8 in the B3 Curves Manual.

4.5 Cash Settled Soybean Futures Contract at the CME Group Mini Soybean Futures Contract Price (SJC)

The settlement price for the Cash Settled Soybean Futures Contract at the Price of the CME Group Mini Soybean Futures Contract is expressed in U.S. Dollars per 450 bags of 60 net kilograms, to four decimal places rounded to the fourth decimal place.

The settlement price for all SJC expirations are calculated based on the settlement prices of the respective CME Group Mini Soybean Futures expiration according to equation (4.12).

$$PA_{SJC^n} = PA_{YK^n} \times Factor_{conv} \tag{4.12}$$

Where:

PA_{SJC^n} = settlement price for the nth SJC expiration, rounded to the fourth decimal place.

PA_{YK^n} = settlement price for the CME Group Mini Soybean Futures Contract (YK) with the same SJC expiration;

$Factor_{conv}$ = the YK price conversion factor for the SJC quotation unit equal to 0.0220462.

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4.6 Cash Settled FOB Santos Soybean Futures (S&P GLOBAL PLATTS)

The settlement price of the FOB Santos Soybean Futures Contract (SOY) is expressed in US dollars per 34 metric tons, to two decimal place rounded to the second decimal place.

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of indirect (distinct intermediaries) **valid trades** within the **average calculation window** according to the parameters shown in Table 6 of the Monthly Parameters Annex for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) calculated according to the methodology of **VWAP** (see methodology in the **GENERAL PROVISIONS, Market Pricing, (iv) VWAP**) with books checked every 1 second, and observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 6 of the *Monthly Parameters Annex*.

P3. If it is not possible to apply procedure P2, the settlement prices of all SOY maturities are calculated from the settlement prices of the respective maturity of the CME Group (SAS South American Soybean futures) contract, according to equation (4.13).

$$PA_{SOY^n,t} = PA_{SAS^n,t} \tag{4.13}$$

where:

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$PA_{SOY^n,t}$ = settlement price for the n-th SOY expiration on trading session *t*, rounded to the second decimal place;

$PA_{SAS^n,t}$= CME Group (SAS) South American Soybean Futures settlement price with the same maturity as SOY on trading session t;

The price determined by P3 (theoretical price) will be validated by **valid** bid or ask orders that have not generated an average price.

During the trading month before the expiration date, the settlement price of the first expiration will be calculated using the average, as per equation (4.14):

$$PA_{SOY^n,t} = \alpha_N \times PA_{SOY^n,t}^{P1-P3} + (1-\alpha_N) \times Media\ Indicator\ Platss_N \qquad (4.14)$$

Where:

$N\ is$ the number of trading sessions that have already taken place in the calculation period of the Platts settlement indicator

α_N : The proportion corresponding to the term for the expiration of the contract;

$PA_{SOY^n,t}^{P1-P3}$: The reference price for this expiration, obtained from the sequence of procedures (P1, P2 and P3);

$Media\ Indicator\ Platss_N$ is the average of the Price Assessments published by Platts within the indicator calculation period. If the indicator corresponding to day N is not available until the time of calculation of the settlement price, $PA_{SOY^n,t}^{P1-P3}$ for that day the calculation of the average will be considered.

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Note: *The calculation period will start on the first day of the month prior to the reference month and will end on the last trading day (the day before the expiration date, on the fifteenth day of the month prior to the reference month).*

4.7 7/8 Conilon Coffee Futures Contract (CNL)

The settlement price for the 7/8 Conilon Futures Contract (CNL) is expressed in Brazilian Reals per 100 bags, to two decimal places rounded to the second decimal place.

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of indirect (distinct intermediaries) **valid trades** within the **average calculation window** according to the parameters shown in Table 6 of the Monthly Parameters Annex for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) calculated according to the methodology of **VWAP** (see methodology in the **GENERAL PROVISIONS, Market Pricing, (iv) VWAP**) with books checked every 1 second, and observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 6 of the *Monthly Parameters Annex*.

P3. If the P2 procedure cannot be applied, the settlement price for the maturity in question will be determined as follows, for each maturity (equation 4.15):

1. identify, into the season or off-season group to the corresponding maturity to be calculated (n), the maturities whose pricing will be determined by the P1 or P2 procedures;

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2. between these maturities, verify the maturity with the greatest liquidity (key), that is, the maturity with most open contracts in the previous trading day;
3. for this maturity (key), the additive variation will be calculated, between the previous trading date settlement price ($SP_{CNL,t-1}^{key}$) and the current trading date settlement price ($SP_{CNL,t}^{key}$);
4. then the additive variation is applied to the previous day settlement price, of the maturity to be priced ($SP_{CNL,t-1}^{n}$).

If two or more maturities have the same number of open contracts, the maturity with the shortest term in business days between the maturity date of this one and the calculation date (t) will be used. The season or off-season groups are defined annually and follow the distribution in Table 7 of the Monthly Parameters Annex.

$$SP_{CNL,t}^{n} = SP_{CNL,t-1}^{n} + \left(SP_{CNL,t}^{key} - SP_{CNL,t-1}^{key}\right) \tag{4.15}$$

Where:

$SP_{CNL,t}^{n}$ = settlement price for the n-th CNL expiration on trading session t .

$SP_{CNL,t-1}^{n}$ = settlement price for the n-th CNL expiration on trading session $t-1$.

$SP_{CNL,t}^{key}$ = settlement price for the key CNL expiration on trading session t.

$SP_{CNL,t-1}^{key}$ = settlement price for the key CNL expiration on trading session $t-1$.

P4. If there are no maturity determined by P1 or P2 in the *n* maturity block in question, the key maturity will be determined as follows, for each maturity:

1. identify, between the other blocks, the respective key maturity (according to the items 1 and 2 from procedure P3);

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2. from these keys maturities, the period in working days between the maturity n and each key maturity day is calculated;
3. the key used in P4 procedure is the shortest period. This will be used in the same equation as the P3 procedure (equation 4.15).

If two due dates have the same number of period, the key maturity will be the closest to the due date.

P5. If we cannot apply the previous procedures to a expiration, we will determine the settlement price, according to equation (4.16)

$$\mathrm{SP}_{CNL,t}^{n} = \mathrm{SP}_{CNL,t-1}^{n} \times Spread \tag{4.16}$$

Where: $Spread$ is calculated using the lagged daily variation ratio of the CEPEA/ESALQ Robusta Coffee Price Index, according to equation (4.17):

$$Spread = \frac{Index_{t-1}}{Index_{t-2}} \tag{4.17}$$

P6. If there are no expiration determined by P1 or P2, the settlement price will be the settlement price from the previous trading session, according to equation (4.18):

$$\mathrm{SP}_{CNL,t}^{n} = \mathrm{SP}_{CNL,\mathrm{t}-1}^{n} \tag{4.18}$$

P7.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and a following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.5 in the B3 Curves Manual.

P7.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and no following expiration (*p*) with a

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settlement price defined by P1 or P2, the settlement price of contract n will be defined by the extrapolation flat, given in the Section 1.4.8 in the B3 Curves Manual.

4.8 7/8 Gold Futures Contract (GLD)

The settlement price for the Cash Settled Gold Futures Contract (GLD) is expressed in U.S. dollar per troy ounce to 2 decimal places.

4.8.1 All open expirations

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of **valid trades** (see General Provisions section) within the **average calculation window** according to the parameters shown in Table 6 of the Monthly Parameters Annex for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) of the valid bid and asks offers, with valid bid-ask spread, calculated according to the methodology of **VWAP: Volume weighted average price** (see methodology in the **GENERAL PROVISIONS** chapter at the beginning of this manual) for this maturity, observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 6 of the *Monthly Parameters Annex*.

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be defined according to the equation (4.19).

$$PA_{GLD^n,t} = PA_{GLD^n,t-1} \times Spread \qquad (4.19)$$

Where:

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$PA_{GLD^n,t}$ = settlement price for the nth GLD expiration in trading session t;

$PA_{GLD^n,t-1}$ = settlement price for the nth GLD expiration in trading session t-1;

$Spread$ = determined by one of the methods (P3.1 or P3.2) below:

P3.1 If there is at least one expiration j with settlement price determined by P1 or P2 procedure, the spread used in the remaining n expiration will be defined according to the equation (4.20).

$$Spread = \sum_{j=1}^{k} \frac{Spread_j}{k} \tag{4.20}$$

Where:

k = quantity of expiration with settlement price determined by P1 or P2 procedure.

$Spread_j = \frac{PA_{GLD^n_{,t}}}{PA_{GLD^n_{,t-1}}}$, ratio between settlement price for the nth GLD expiration in trading sessions t and $t-1$.

P3.2 If there are no maturities determined by procedure P1 or P2, the Spread is determined by the *LBMA Gold Price PM*[2] index ratio, administered by the *ICE Benchmark Administration Limited,* according to equation (4.21).

$$Spread = \frac{LBMA\ Gold\ Price\ PM_t}{LBMA\ Gold\ Price\ PM_{t-1}} \tag{4.21}$$

Where:

$LBMA\ Gold\ Price\ PM_t$ = reference price *LBMA Gold Price PM*[2] Index in U.S. Dollar in the trading session t;

[2] O LBMA Gold Price is a trade mark of Precious Metals Prices Limited, is licensed to ICE Benchmark Administration Limited (IBA) as the administrator of the LBMA Gold Price, and is used by B3 with permission under license by IBA.

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$LBMA\ Gold\ Price\ PM_{t-1}$ = reference price *LBMA Gold Price PM*[2] Index in U.S. Dollar in the trading session t-1.

P4.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and a following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.5 in the B3 Curves Manual.

P4.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and no following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the extrapolation flat, given in the Section 1.4.8 in the B3 Curves Manual.

4.8.2 First open expiration on the maturity date

The settlement price for the first open expiration GLD is the *LBMA Gold Price PM*[2] Index in U.S. Dollar t[i]o the maturity date.

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5 SOVEREIGN DEBT INSTRUMENTS

5.1 Ten-Year U.S. Treasury Note Futures Contract (T10)

The settlement price for the Ten-Year U.S. Treasury Note Futures Contract (T10) is expressed in U.S. Dollars per unit.

The settlement prices of all T10 maturities are calculated on the hour, according to the parameters in Table 9 of the Monthly Parameters Annex, based on the settlement prices of the respective maturities of the United States 10-Year Treasury Note Futures contract truncated in the fourth decimal place.

On the last day of contract negotiation, the settlement price is defined by the first trade made at 11 am in New York or the closest after.

On the day the contract is settled, the value of the last trading day is used.

On dates when there is no adjust price disclosure by CME, the value of the last trading day is used.

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6 CRYPTO ASSETS

6.1 Bitcoin Futures (BIT)

The settlement price for the Bitcoin Futures Contract (BIT) is expressed in Brazilian reais per Bitcoin to 2 decimal places

6.1.1 All open expirations

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of **valid trades** (see General Provisions section) within the **average calculation window** according to the parameters shown in Table 11 of the *Monthly Parameters Annex* for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) of the valid bid and asks offers, with valid bid-ask spread, calculated according to the methodology of **VWAP: Volume weighted average price** (see methodology in the **GENERAL PROVISIONS** chapter at the beginning of this manual) for this maturity, observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 11 of the *Monthly Parameters Annex*.

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be defined according to the equation (6.1).

$$PA_{BIT^n,t} = PA_{BIT^n,t-1} \times Spread \qquad (6.1)$$

Where:

$PA_{BIT^n,t}$ = settlement price for the nth BIT expiration in trading session t;

$PA_{BIT^n,t-1}$ = settlement price for the nth BIT expiration in trading session t-1;

$Spread$ = determined by one of the methods (P3.1 or P3.2) below:

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P3.1 If there is at least one expiration j with settlement price determined by P1 or P2 procedure, the spread used in the remaining n expiration will be defined according to the equation (6.2).

$$Spread = \sum_{j=1}^{k} \frac{Spread_j}{k} \tag{6.2}$$

Where:

k = quantity of expiration with settlement price determined by P1 or P2 procedure;

$Spread_j = \frac{PA_{BIT^j_{,t}}}{PA_{BIT^j_{,t-1}}}$, ratio between settlement price for the jth BIT expiration in trading sessions t and t-1.

P3.2 If none of the n expiration is determined by procedure P1 or P2, the ratio of the Nasdaq Bitcoin Settlement Price Index (Bitcoin) between the two last trading sessions of the future on B3 is used, converted to reais by multiplying by the exchange rate of reais per U.S. dollar for settlement on a day announced by B3 (DOLD1), according to the equation (6.3):

$$\text{Spread} = \frac{\text{Bitcoin}_t \times DOLD1_t}{\text{Bitcoin}_{t-1} \times DOLD1_{t-1}} \tag{6.3}$$

Where:

$Bitcoin_t$ = closing price for bitcoin's indicator in U.S. dollars in the trading session t.

$Bitcoin_{t-1}$ = closing price for bitcoin's indicator in U.S. dollars in the trading session t-1 (date of the previous trading session of the futures on B3).

$DOLD1_t$ = exchange rate of Brazilian reais per U.S. dollar reference from B3, announced at t;

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$DOLD1_{t-1}$ = exchange rate of Brazilian reais per U.S. dollar reference from B3, announced at t-1.

P4.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and a following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the price interpolation, given in the Section 1.4.5 in the B3 Curves Manual.

P4.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and no following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.8 in the B3 Curves Manual.

6.1.2 First open expiration on the last trading day

The settlement price for the first BIT expiration is the Nasdaq Bitcoin Settlement Price Index, multiplied by the one-day exchange reference rate of reais to United States Dollars published by B3.

6.2 Ethereum Futures (ETR)

The settlement price for the Ethereum Futures Contract (ETR) is expressed in U.S. dollars per Ether to 2 decimal places.

6.2.1 All open expirations

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of **valid trades** (see General Provisions section) within the **average calculation window**

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according to the parameters shown in Table 11 of the *Monthly Parameters Annex* for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) of the valid bid and asks offers, with valid bid-ask spread, calculated according to the methodology of **VWAP: Volume weighted average price** (see methodology in the **GENERAL PROVISIONS** chapter at the beginning of this manual) for this maturity, observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 11 of the *Monthly Parameters Annex*.

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be defined according to the equation (6.4).

$$PA_{ETR^n,t} = PA_{ETR^n,t-1} \times Spread \qquad (6.4)$$

Where:

$PA_{ETR^n,t}$ = settlement price for the nth ETR expiration in trading session t;

$PA_{ETR^n,t-1}$ = settlement price for the nth ETR expiration in trading session t-1;

$Spread$ = determined by one of the methods (P3.1 or P3.2) below:

P3.1 If there is at least one expiration j with settlement price determined by P1 or P2 procedure, the spread used in the remaining n expiration will be defined according to the equation (6.5).

$$Spread = \sum_{j=1}^{k} \frac{Spread_j}{k} \qquad (6.5)$$

Where:

k = quantity of expiration with settlement price determined by P1 or P2 procedure;

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$Spread_j = \frac{PA_{ETR^j_{,t}}}{PA_{ETR^j_{,t-1}}}$, ratio between settlement price for the jth ETR expiration in trading sessions t and t-1.

P3.2 If none of the n expiration is determined by procedure P1 or P2, the ratio of the Nasdaq Ether Settlement Price Index (Ether) between the two last trading sessions of the future on B3 is used, according to the equation (6.6):

$$\text{Spread} = \frac{\text{Ether}_t}{\text{Ether}_{t-1}} \tag{6.6}$$

Where:

$Ether_t$ = closing price for Ether's indicator in U.S. dollars in the trading session t.

$Ether_{t-1}$ = closing price for Ether's indicator in U.S. dollars in the trading session t-1 (date of the previous trading session of the futures on B3).

P4.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and a following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the price interpolation, given in the Section 1.4.5 in the B3 Curves Manual.

P4.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and no following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.8 in the B3 Curves Manual.

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6.2.2 First open expiration on the last trading day

The settlement price for the first ETR expiration is the Nasdaq Ether Reference Price Index – Settlement, multiplied by the one-day exchange reference rate of reais to United States Dollars published by B3.

6.3 Solana Futures (SOL)

The settlement price for the Solana Futures Contract (SOL) is expressed in U.S. dollars per Sol to 2 decimal places.

6.2.1 All open expirations

Procedure Sequence to determine the settlement price for a given expiration of the contract

P1. The settlement price will be calculated using the average price of **valid trades** (see General Provisions section) within the **average calculation window** according to the parameters shown in Table 11 of the *Monthly Parameters Annex* for the afore-mentioned contract.

P2. If procedure P1 cannot be applied, the settlement price for the expiration in question will be the average price (Mid) of the valid bid and asks offers, with valid bid-ask spread, calculated according to the methodology of **VWAP: Volume weighted average price** (see methodology in the **GENERAL PROVISIONS** chapter at the beginning of this manual) for this maturity, observing the **Quantity Limit** and **Spread Limit** parameters stipulated in Table 11 of the *Monthly Parameters Annex*.

P3. If procedure P2 cannot be applied, the settlement price for the expiration in question will be defined according to the equation (6.7).

$$PA_{SOL^n,t} = PA_{SOL^n,t-1} \times Spread \qquad (6.7)$$

Where:

$PA_{SOL^n,t}$ = settlement price for the nth SOL expiration in trading session t;

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$PA_{SOL^n,t-1}$ = settlement price for the nth SOL expiration in trading session t-1;

$Spread$ = determined by one of the methods (P3.1 or P3.2) below:

P3.1 If there is at least one expiration j with settlement price determined by P1 or P2 procedure, the spread used in the remaining n expiration will be defined according to the equation (6.8).

$$Spread = \sum_{j=1}^{k} \frac{Spread_j}{k} \quad (6.8)$$

Where:

k = quantity of expiration with settlement price determined by P1 or P2 procedure;

$Spread_j = \frac{PA_{SOL^j_{,t}}}{PA_{SOL^j_{,t-1}}}$, ratio between settlement price for the jth SOL expiration in trading sessions t and t-1.

P3.2 If none of the n expiration is determined by procedure P1 or P2, the ratio of the Nasdaq Solana Settlement Price Index (Solana) between the two last trading sessions of the future on B3 is used, according to the equation (6.9):

$$\text{Spread} = \frac{\text{Solana}_t}{\text{Solana}_{t-1}} \quad (6.9)$$

Where:

$Solana_t$ = closing price for Solana's indicator in U.S. dollars in the trading session t.

$Solana_{t-1}$ = closing price for Solana's indicator in U.S. dollars in the trading session t-1 (date of the previous trading session of the futures on B3).

P4.1. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and a following expiration (*p*) with a

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settlement price defined by P1 or P2, the settlement price of contract n will be defined by the price interpolation, given in the Section 1.4.5 in the B3 Curves Manual.

P4.2. If it is the first trading day of the contract n and no settlement price has been determined by procedures P1 or P2, having previous expiration (*a*) with a settlement price defined by P1 or P2 and no following expiration (*p*) with a settlement price defined by P1 or P2, the settlement price of contract n will be defined by the exponential interpolation, given in the Section 1.4.8 in the B3 Curves Manual.

6.1.2 First open expiration on the last trading day

The settlement price for the first SOL expiration is the Nasdaq Solana Settlement Price Index, multiplied by the one-day exchange reference rate of reais to United States Dollars published by B3.

6.4 Bitcoin Futures in U.S. Dollars (BTC)

The settlement price of the Bitcoin Futures Contract (BTC) is expressed in U.S. dollars per bitcoin, with two decimal places and rounded to the second decimal place.

All Open Maturities

Sequence of procedures for determining the settlement price ($PA_{BTC^n,t}$) for each contract maturity:

P1. The settlement price shall be the volume-weighted average price calculated from **valid trade** (see **General Provisions**, Market Pricing, (i) Valid trade) executed during **the averaging calculation window**, the latter defined in Table 11 of the Monthly Parameters Annex for said contract.

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P2. If procedure P1 cannot be applied, the settlement price for the maturity in question shall be the **Mid price** determined by the VWAP Methodology (see **General Provisions**, Market Pricing, (iv) VWAP), with order books captured every 1 second, and validated according to the parameters in Table 11 of the Monthly Parameters Annex.

P3. If the previous procedures cannot be applied, the settlement price of the BTC contract ($PA_{BTC^n,t}$), for the respective maturity n, for calculation date t, shall be determined using the no-arbitrage model, according to the formula below (6.10):

$$PA_{BTC^n,t} = PA_{BIT^n,t} \times \frac{1.000}{PA_{DOL^n,t}} \tag{6.10}$$

where:

$PA_{BIT^n,t}$ = settlement price for the n- -th maturity of the bitcoin futures contract in Brazilian reais (BIT) on trading session *t*;

$PA_{PT1^n,t}$ = settlement price for the n-th maturity of the Brazilian reais per U.S. dollar commercial futures contract (DOL) on trading session *t*;

- For maturity n of the BTC bitcoin contract being calculated, if it coincides with the respective maturity of the Brazilian reais per U.S. dollar commercial futures contract (DOL), then PA_{DOL^n} be the closing settlement price of the respective maturity n of the Brazilian reais per U.S. dollar commercial futures contract (DOL) on date t;
- For maturity n of the BTC bitcoin contract being calculated, if it does not coincide with the respective maturity of the Brazilian reais per U.S. dollar commercial futures contract (DOL), then PA_{DOL^n} shall be the vertex of the Brazilian Reals vs. U.S. Dollar Forward Curve (PTX), described in Chapter 4.1 of the Curves Manual, whose term corresponds to maturity n being calculated on date t, multiplied by 1,000.

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1.000 = respective quotation factor of the Brazilian reais per U.S. dollar commercial futures contract (DOL).

First Open Maturity on Expiration Date

The settlement price of the first BTC maturity is the Nasdaq Bitcoin Settlement Price Index in U.S. dollars.

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7 FINAL PROVISIONS

Valid from 1st version: 03/02/2015

Id say- constributors

Production	Superintendência de Modelos de Risco
Revision	Diretoria de Administração de Risco
Approval	Diretoria Executiva

Change log

Version	Item	Issue	Justification	Date
1	NA	NA	NA	02/24/2015
2	Addition	New contracts	Completing the manual	03/31/2020
3	Section 3.1.1	Average calculation time period	New calculation time	06/22/2020
4	Section 3.3.2	First open expiration on the last trading day – Including *Ticker* BBG	Make the calculation price and disclosure time explicit	06/26/2020
5	Section 3.9	Change in equation (3.19)	Update	03/01/2022
	Section 1.7	Change in DAP pricing formula	Methodology improvement	
	Section 4.10	SOY contract	Adding new contract	
6	Section 4.4.10	SOY tuning methodology	Change in the Fallback rule (P3) of the contract.	02/21/2022
7	Section 3.1.1 3.1.4	Description of the calculation window time	Change of schedule for the annex of monthly parameters - Table 10.	03/11/2022
7	Section 5.5.1	Description of the calculation window time	Change of schedule for the annex of monthly parameters - Table 11.	03/11/2022

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8	All Sections	Document UpDate	inclusion of rounding and truncation criteria in calculations	07/04/2022
9	Section 3.9. 3.9.1 3.9.2	Stock Future Calculation Methodology	Withdrawal of procedures P1 and P2. It is now calculated using a non-arbitrage model, Fallback. According to OC 109/2022 - PRE	31/08/2022
10	Section 3.1.1 4.1 4.2 4.3 4.4 4.6 4.7 4.9 5.1	Update of reference tables.	Modifications of Table Numbering.	09/09/2022
11	Section 3.10, 3.11 and 3.12	Introduction.	Adding new contract.	12/12/2022
	General provisions Section 1.1	VWAP DI1 contract	Adding new method Changes on P1 and P2	
12	Section 2	Removal	Word Libor Indicator	06/01/2023

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		Change	Calculation period	
13	Section 2.16.1, 2.21 and 2.22	Change	Composite Rate provider changed	14/02/2023
14	Section "Market Pricing" Section 2	Change Change and Inclusion	Change in the formulas of valid spread and VWAP Change in the references of previous sections; Inclusion of the methodology in case of unavailable of rate in foreign market	03/09/2023
15	Section 2.16.1	Inclusion	Use of FX Forward Swap contract	01/06/2023
16	Section "Market Pricing" in General Provisions Section 1.8	Change and Inclusion Change	Inclusion of the new methodology and equations for the "Volume Weighted Average Price at the End of the Closing Call" Change in the Future DAP methodology in P2 and P3	07/31/2023
17	Section 1.8 Section 4.6 – Sugar Future	Revision of the DAP Adjustment text Removal	General corrections to the text about the DAP Fallback Removal of product no longer sold	09/11/2023

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18	Section 3.3 Section 4.1 – Live Cattle Future (BGI) Future SF1 and OZ1	Referring to the Monthly Parameters Annex Change on P2's methodology Removal	Hour and duration of the calculation window are now stipulated in the Monthly Parameters Annex Method P2 is now calculated via VWAP Removal of products no longer sold	11/27/2023
19	Section 4.2 – Arabica Coffee Future (ICF)	Change on P2's methodology	Method P2 is now calculated via VWAP	11/29/2023
20	Section 4.4 – Corn Future (CCM)	Change on P2's methodology	Method P2 is now calculated via VWAP	12/01/2023
21	General Provisions: Market Pricing – (i) Valid Trades Section 4 - Commodities Section 4.3 – Hydrous Ethanol Future (ETH)	Removal Removal	Removal of topic c) Removal of concepts definitions that are already explained in "Market Pricing" Method P2 is now calculated via VWAP	01/22/2024

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		Change on P2's methodology		
22	Section 4.5 – FOB Santos Soybean (SOY)	Change on P2's methodology	Method P2 is now calculated via VWAP	01/24/2024
23	Section 3.1.5, 3.2.3 and 3.12.2	Inclusion	Settlement Index	02/14/2024
24	Section 6	Inclusion	Bitcoin Futures	04/17/2024
25	Section 2.3.1	Change on AUD, CAD, NZD, EUR, WEU CHF, BGP, TRY, ARB, CLP, MXN, JPY and ZAR's methodology	"General Formula: All Expirations" is now calculated via the future of the currency in USD	05/17/2024
26	Section 3.13	Inclusion	Small Caps Index Futures	08/03/2024
27	Section 4.7 Section 6.1 Section 3.4 Section 3.5 Section 3.6	Inclusion Inclusion Change Change Change	7/8 Conilon Coffee Futures Decimal places number Change on the text "all open expirations" and "first open expiration on the last trading day text"	09/20/2024
28	Section 3.8	Change	Change on the text "all open expirations"	11/28/2024

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29	General Provisions Section 4.4	Change Change CCM methodology	Improvement in the description text of the model "(iv) VWAP: Volume Weighted Average Price" Change in the model used from the P3 procedure, for Corn futures (CCM)	03/05/2025
30	Section 3.3	Change	Change in the P2 procedure, to use the VWAP methodology	03/31/2025
31	Section 4.1	Change BGI methodology	Change in the model used from the P3 procedure, for Live Cattle futures (BGI)	05/05/2025
32	Section 6.2 Section 6.3	Inclusion Inclusion	Ethereum Futures Solana Futures	06/16/2025
33	Section 3.14 Section 1.9 Section 1.10 Section 1.11 Section 2.3.1	Inclusion Inclusion Inclusion Inclusion Change	Bovespa B3 BR+ Index Futures (IBBR) F-TIIE Futures (TIE) SOFR Futures (SFR) ESTR Futures (EST) Change to use the PTX curve for maturities of currency X futures contract that do not coincide with DOL maturities	06/27/2025

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34	Section 1.9 Section 1.10 Section 1.11	Change	Procedure for holidays in the underlying asset source (TIE, SFR, and EST)	07/03/2025
35	Section 1 Section 2 Section 3 Section 6	Change	Update of the numbering of the reference tables in the Parameters Annex	07/09/2025
36	Section 4.8	Inclusion	Gold Futures (GLD)	07/21/2025
37	Section 1.9 Section 1.10 Section 1.11	Change	New methodology for obtaining zero rates from discount factors for procedure P3	07/29/2025
38	Section 4.3	Change	Change in the P3 procedure	10/31/2025
39	Section 3.15	Inclusion	S&P/B3 Bovespa VIX Index Future	12/05/2025
40	Section 4.7	Change	Include a new P5 procedure	02/23/2026
41	General Provisions Section 1.8 Section 2.3.4	Change	Correction of typo in the text of 'Mark-to-Market Pricing' Inclusion of Theoretical Methodology from the B3 Curves Manual Change in the vertices referring to the ARS and CLP curves, in table 2.2.	07/09/2026
42	Section 6.4	Inclusion	Include the methodology to Bitcoin Futures in U.S. Dollars (BTC)	09/18/2026

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