

**EXCHANGE RATE OF BRAZILIAN REAIS PER US DOLLARS**

13/09/2024

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# INTRODUCTION

This technical note presents the methodology for calculating and collecting data to define the daily reference exchange rate of Brazilian reais per US dollar.

# Clean Coupon Dollar

The clean coupon dollar represents the spot exchange rate for settlement in two days, relative to the calculation time of the futures contract price adjustment. The clean coupon dollar rate for date t is obtained from the collection of the dollar spread of the day (𝑐𝑎𝑠𝑎𝑑𝑜 𝑐𝑜𝑙𝑒𝑡𝑎𝑑𝑜𝑡) and the adjustment of the first maturity of the dollar futures contract (𝑃𝐴𝑉1). The clean coupon dollar is the differential between the adjustment price of the first maturity and the spot exchange rate for settlement in two days. Specifically:

*Clean Coupon Dollar Rate𝑡*

𝑃𝐴𝑉1 − 𝑐𝑎𝑠𝑎𝑑𝑜 𝑐𝑜𝑙𝑒𝑡𝑎𝑑𝑜𝑡

=

𝐷𝑂𝐿 𝐹,𝑡

1.000

rounded to the fourth decimal place. On the last day of the month, both the spread and the clean coupon dollar use the second maturity of the dollar futures as a reference.

The spread is obtained from data providers, whose characteristics are detailed in Section 4. From the collected spread rates, an outlier filter is applied, where data outside the following range are discarded:

𝑚(𝑎) − 𝑑𝑝(𝑎) ∗ 𝑁97,5% ≤ 𝑐𝑖 ≤ 𝑚(𝑎) + 𝑑𝑝(𝑎) ∗ 𝑁97,5%

Where:

𝑎: sample of contributors

𝑚( ⋅ ): arithmetic mean

𝑑𝑝( ⋅ ): standard deviation

𝑁97,5%: percentile of the standard normal distribution with two decimal places, 𝑁97,5% = 1,96.

The simple arithmetic mean of rates within the interval, rounded to the second decimal place, defines the dollar spread for the day.

# Two-Day Reference Rate

Along with the collection of the dollar spread, the exchange rate for two-day purchase and sale is collected. For each data provider, the average rate between purchase and sale is calculated. The two highest and two lowest rates are excluded from the sample, and with the remaining data, the simple arithmetic mean is calculated to obtain the two-day reference rate, rounded to the fourth decimal place.

# One-Day Reference Rate

The one-day reference rate is obtained from the two-day reference rate by applying an interest adjustment according to the following formula, rounded to the fourth decimal place:

*Two-Day Reference Rate𝑡*

*One-Day Reference Rate*𝑡 =

( (1 + 𝐶𝐷𝐼𝑡)1/252 )

1 + 𝑆𝑂𝐹𝑅𝑡

𝑑𝑐

360

∗

Where:

* 𝐶𝐷𝐼𝑡: CDI rate for calculation date *t*.
* 𝑆𝑂𝐹𝑅𝑡: taxa Secured Overnight Financing Rate published by the Federal Reserve Bank of New York on date t. In the absence of the rate due to a holiday in New York, the last published SOFR rate will be used.
* 𝑑𝑐: number of calendar days between calculation date t and the next business day

# Data Providers

The exchange rate for settlement in two days is collected from a set of data providers during the 30 minutes preceding the closing of the dollar futures contract trading. The data providers are banks that act as clearing members of the Clearing House and are among the top 20 clearing members by financial volume accumulated in the quarter. The period of evaluation for banks and their role as data providers can be consulted at www.b3.com.br, under Market Data and Indices, Data Services, Market Data, Queries, Derivatives Market, Indicators, Financial Indicators.

If on the calculation date there are fewer than 12 but more than 7 data providers, the sample will be considered valid if there are at least eight valid contributions, with a contribution being valid if it falls within the range:

𝑚(𝑎) − 𝑑𝑝(𝑎) ∗ 𝑇97,5% ≤ 𝑐𝑖 ≤ 𝑚(𝑎) + 𝑑𝑝(𝑎) ∗ 𝑇97,5%

sendo

𝑎: sample of contributors

𝑚( ⋅ ): arithmetic mean

𝑑𝑝( ⋅ ): standard deviation

𝑇97,5%: percentile of the t-student distribution with degrees of freedom equal to the sample size minus 1..

If on the calculation date, there are fewer than 8 data providers, the last valid spread will be used, adjusted according to the following formula, to arbitrate the two-day exchange rate:

𝑐𝑎𝑠𝑎𝑑𝑜 𝑐𝑜𝑙𝑒𝑡𝑎𝑑𝑜𝑡−1

𝑐𝑎𝑠𝑎𝑑𝑜 𝑎𝑟𝑏𝑖𝑡𝑟𝑎𝑑𝑜𝑡 =

( (1 + 𝐶𝐷𝐼𝑡)1/252 )

1 + 𝑆𝑂𝐹𝑅𝑡

𝑑𝑐

360

∗

*𝑇wo-day reference rate𝑡*

𝑃𝐴𝑉1 − 𝑐𝑎𝑠𝑎𝑑𝑜 𝑎𝑟𝑏𝑖𝑡𝑟𝑎𝑑𝑜𝑡

=

𝐷𝑂𝐿 𝐹,𝑡

1.000

Where 𝑑𝑐 is the number of calendar days between calculation date t and the previous business day.

This technical note is available at www.b3.com.br, Market Data and Indices, Data Services, Market Data, Queries, Derivatives Market, Methodology, Methodology of the Reference Dollar Exchange Rate Indicator.

# Change Log

|  |  |  |  |
| --- | --- | --- | --- |
| **Version** | **Item modified** | **Modification** | **Date** |
| **1** | Original Version | -- | 25/05/2023 |
| **2** | 3 and 4 | Replaced LIBOR with SOFR | 01/07/2023 |