PRE-OPENING/ PRE-CLOSING/ FIXING RULES

Theoretical price formation (fixing)

The criteria for theoretical price formation are described below:

I. First criterion: The auction price is the price at which the largest quantity of the asset or derivative is traded.

Example 1

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
ELET6	ELETROBRAS PNB*		18.10	17.51	17.50		
Brok	**Time**	**Quantity**	**Purchase offer**	**Sales offer**	**Quantity**	**Time**	**Brok**
B	13:09:34	1m000	17.51	17.50	2m000	13:08:15	C
A	13:07:45	2m000	17.50				

Auction Price Table

Price	Qty. on Buy Side	Qty. on Sell Side	Qty. Matched
17.51	1,000,000	2,000,000	1,000,000
17.50	3,000,000	2,000,000	2,000,000

The auction price is set at 17.50, since at this price the largest quantity of shares is traded.

Trades Generated

Qty.	Price	Buyer	Seller
1m000	17.50	A	C
1m000	17.50	B	C

Market after auction close:

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
ELET6	ELETROBRAS PNB*		18.10	17.51			
Brok	**Time**	**Quantity**	**Purchase offer**	**Sales offer**	**Quantity**	**Time**	**Brok**
A	13:07:45	1m000	17.50				

II. Second criterion: In the event of a tie on the first criterion, i.e. if there are two or more prices at which the same quantity of assets or derivatives is traded, the prices that create the smallest imbalance in the sale are selected, and in the interval between these prices the theoretical price is the closest to the price of the last trade, or in its absence the closest to the adjusted closing price or, for derivatives only, the closest to the settlement price for the trading session, rounded in accordance with tick size.

Example 2

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
GGBR4	GERDAU PN* N1		37.51	38.00	40.01	H 13:23	
Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
C	13:09:34	1m000	40.50	40.00	1m000	13:08:15	B
A	13:07:45	1m000	40.00				

Auction Price Table

Price	Qty. on Buy Side	Qty. on Sell Side	Qty. Matched	Imbalance
40.50	1,000,000	1,000,000	1,000,000	0
40.00	2,000,000	1,000,000	1,000,000	1,000,000 C

The selected prices are 40.00 and 40.50.
The order at the price of 40.00 is not executed, therefore this price is excluded from the price scale assigned by the system (40.01 to 40.50).
In the auction above, the theoretical price is set at 40.01 (closest to the last traded price, which was 38.00).

Generated Trade

Qty.	Price	Buyer	Seller
1m000	40.01	C	B

Market after auction close:

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
GGBR4	GERDAU PN* N1		37.51	40.01			
Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
A	13:07:45	1m000	40.00				

III. Third criterion: In the event of a tie on the first and second criteria, i.e. if there are two or more prices at which the same quantity of assets or derivatives is traded, and two or more prices at which the same imbalance is created on opposite sides, the auction price is the closest price to the price of the last trade among those that created the tie on the second criterion, or in its absence the closest to the adjusted closing price or, for derivatives only, the closest to the settlement price for the trading session, rounded in accordance with tick size.

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
VALE3	VALE ON NM		13.00	12.80	12.90	H 14:23	
Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
A	14:20:05	400	13.10	12.90	500	14:20:29	C
B	14:20:13	100	13.00	13.10	100	14:20:41	D

Auction Price Table

Price	Qty. in Buy	Qty. in Sell	Qty. Traded	Imbalance
13.1	400	600	400	200 Sell
13.0	500	500	500	0
12.9	500	500	500	0

The selected prices are 12.90 and 13.00. Both prices are included in the price range assigned by the system, since the imbalances are zero. In the example above, the auction price is set at 12.90 (closest to the last price, which was 12.80).

Trades Generated

Qty.	Price	Buyer	Seller
400	12.90	A	C
100	12.90	B	C

Market after auction close:

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
VALE3	VALE ON NM		13.00	12.90			
Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
				13.10	100	14:20:41	D

Characteristics

The characteristics of theoretical price formation are described below:

I. There is no pro-rata matching for orders at the same price, except in the cases specified in this trading procedures manual.

II. The trading system uses a price scale rather than a single price to set the theoretical price, which is as close as possible to the last price or, where applicable, to the settlement price.

III. **Bids** that are equal to or higher than the **theoretical price** and **asks** that are equal to or lower than the **theoretical price** cannot have their quantity reduced but can be changed only to improve the price or increase the quantity, except in cases of correction and/or cancellation of **orders** by B3. These **orders** can be freely canceled in the initial seconds of the **auction**, and, after the free cancelation period, such **orders** can only be cancelled due to operational error. The length of the free cancellation period is available on B3 website.

IV. Bids with a higher price than the theoretical price and asks with a lower price than the theoretical price are completely filled.

V. Bids and asks at the theoretical price may be filled completely, partially or not at all, depending on the theoretical quantity for the auction.

VI. Disclosed quantity (iceberg) orders cannot be registered during an auction. Disclosed quantity orders registered before the start of an auction must comply with the priority rule for the quantity publicly quoted when they joint the auction. If an order is modified, the total quantity must be disclosed to the market.

VII. Remainders of immediate-or-cancel (IOC) orders are canceled at the end of the auction.

Priority

The trading system uses the following priority rules to match trades subject to auction:

I. Market-on-auction (MOA) orders for auctions and market-on-close (MOC) orders for closing calls are matched first. The balance of any such orders that are not completely filled when the auction begins is eliminated;

II. Orders containing price limits have priority for matching at the same price level in accordance with the chronological sequence of their registration, except for orders originating with canceled trades and re-entered by B3.

Auction extensions

The following events may justify an auction extension:

I. A change in the theoretical price;

II. A change in the theoretical quantity;

III. Registration of a new order that changes the filled quantity of a previously registered order;

IV. A change in the unfilled balance;

V. Triggering of the protection tunnel;

VI. A decision by B3 to grant an extension.

Examples

Extension due to a change in the auction's theoretical price:

- **Initial situation: Theoretical Price = 20.00**

Symbol	Name	Closing Price	Price of the last	Theoretical Price
EMBJ3	EMBRAER ON NM	19.97	19.00	20.01

Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
K	13:07:02	1m000	20.00	20.00	1m000	13:12:34	E

Purchase of 1m000 at 20.01: Theoretical Price = 20.01

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
EMBJ3	EMBRAER ON NM		19.97	19.00	20.01		
Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
A	13:16:06	1m000	20.01	20.00	1m000	13:12:34	E
K	13:07:02	1m000	20.00				

EXTENSION DUE TO A CHANGE IN THE AUCTION'S THEORETICAL QUANTITY

Initial situation: Theoretical quantity = 1,000,000

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
ISAE3	ISA ENERGIA ON N1		27.45	27.50	28.00		
Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
D	17:27:11	1m000	28.00	28.00	2m000	17:27:52	B

Purchase of 1m000 at 28.00: Theoretical quantity = 2,000,000

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
ISAE3	ISA ENERGIA ON N1		27.45	27.50	28.00		
Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
D	17:27:11	1m000	28.00	28.00	2m000	17:27:52	B
A	17:29:16	1m000	28.00				

EXTENSION DUE TO THE REGISTRATION OF A NEW ORDER THAT CHANGES THE QUANTITY FILLED BY A PREVIOUSLY REGISTERED ORDER

Initial situation: Theoretical Price: 51.00; Theoretical quantity: 1,000 and quantity filled from order A equals 1,000

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
PETR3	PETROBRAS ON N2		50.18	50.05	51.00		
Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
A	11:49:20	1000	51.00	51.00	1000	11:49:33	B

Purchase of 900 at 51.10; Theoretical Price: 51.00; Theoretical quantity: 1,000 and quantity filled from order A reduced to 100

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
PETR3	PETROBRAS ON N2		50.18	50.05	51.00		
Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
C	11:50:29	900	51.00	51.00	1000	11:49:33	B
A	11:49:20	1000	51.00				

EXTENSION DUE TO CHANGE IN THE UNFILLED BALANCE

Initial situation: Theoretical Price: 28.00; Theoretical quantity: 1,000,000 and unfilled balance equals zero

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
GGBR4	GERDAU PN N1		30.51	30.00	28.00		
Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
B	17:33:08	1m000	28.00	28.00	1m000	17:33:15	A

Purchase of 100,000 at 28.00; Theoretical Price: 28.00; Theoretical quantity: 1,000,000 and unfilled balance equals 100,000

Symbol	Name		Closing Price	Price of the last	Theoretical Price		
GGBR4	GERDAU PN N1		30.51	30.00	28.00		
Brok	Time	Quantity	Purchase offer	Sales offer	Quantity	Time	Brok
B	17:33:08	1m000	28.00	28.00	1m000	17:33:15	A
C	17:34:14	100k0	28.00				

B3 may extend or open an auction to preserve the regular development of trading.

Extension parameters for auctions

Extension parameters for auctions	Extension Time
1ST extension: when there is a change to one of the 4 criteria in the last 3 minutes (including).	1 Minute (opening call)
2ND extension: when there is a change to one of the 4 criteria in the last 30 seconds (including).	1 Minute
3RD extension: when there is a change to one of the 4 criteria in the last 15 seconds (including).	1 Minute

4TH extension: when there is a change to one of the 4 criteria in the last 15 seconds (including).	Random closing between 30 and 60 seconds

During the entire trading session for the Organized Over-the-counter Market if the first extension criterion is met, that is, there is a change in one of the 4 (four) criteria in the last 02 minutes (inclusive), the auction extension time will be 2 (two) minutes, the rest follow the rule in the table above.

After the third extension, the time for the auction to be extended as well as the extension time does not change and is repeated indefinitely.

*Notes:

(i) exclusively for the closing call, the first extension of the auction will last for 5 minutes, as foreseen in B3's regulations; and

(ii) For ETFs and Options in the 1st extension: if there is a change in one of the 4 criteria in the last 3 minutes (inclusive), the extension time in the call will be 1 minute closing.

Please note that, notwithstanding the changes, there will be no alteration to:

(i) B3's ability to determine extensions to or the opening of the auction in order to maintain the regular development of business and

(ii) (ii) the rules for postponing calls in cases where protection tunnels are triggered and when trading rules are broken; as well as in the case of material facts; of situations foreseen in subparagraphs V and VI of B3's Trading Procedures Manual, of the Pre-Opening, Pre-Closing and Fixing Rules; and other exceptional situations foreseen in B3's rules and in the prevailing regulations.

Simultaneous Auctions

The synchronization of pre-opening auctions for the contracts defined by B3 must occur. Synchronization rules:

- Synchronization only of the pre-opening auction; other phases and auctions during the day remain asynchronous.
- Auctions will start and end at the same time, even though the closing will be carried out randomly every day.
- In case of offer cancellations due to operational errors, the Auction will not be extended as happens for unsynchronized auctions during the random extension.

Synchronization will not occur if:

- The instrument pair does not exist or one of them is in a different phase or state.

- If any protection band is activated at the opening of the auction.
- If there is intervention by B3.