



**MOSCOW
EXCHANGE**

Opening Auction on MOEX FX Market

October 2021

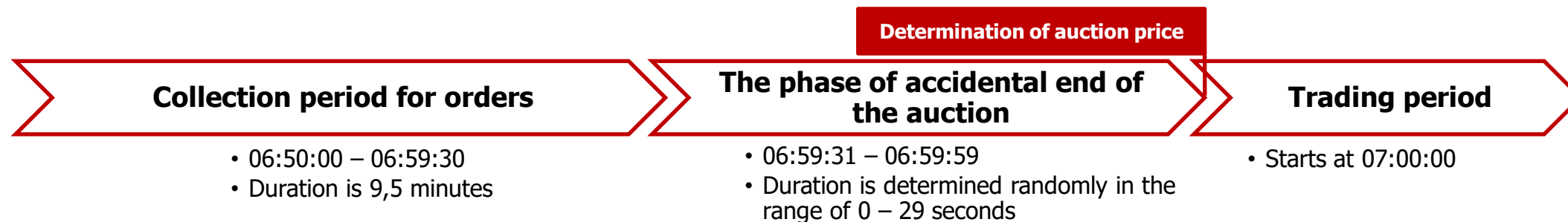
Advantages of the opening auction for FX Market

Increased pricing efficiency

- Opening Auction is held for all **SPOT** instruments on the CETS board **10 minutes** before main trading period start **(06:50:00 – 06:59:59)** to unify timing of opening auctions on securities market and FX market
- Minimization of possibility to manipulate the first trade price using accidental moment for opening auction price determining
- **Synchronization of pricing for the whole Main market sector based on principle that for each SPOT instrument price is formed at the moment of opening auction ends**
- Reducing the effect of non-simultaneity output of market participants for trading: the auction opening allows one to accumulate orders to calculate the effective price to meet the requests of the first trading day
- The applied algorithm for determining the price of opening auction have imbalance of demand and supply considered
- Opening auction is held under control of MOEX risk management system to exclude violation of defined price ranges



The timing of opening auction



Collection period for orders (Call-period and the phase of accidental end of the auction):

- Participants can submit limit orders and market orders
- Withdrawal of active orders

Determination of auction price and execution of orders

- Market orders have the highest priority of execution compared with limit orders.
- Execution priority for limit orders is determined by the best order price. The priority between orders with equal prices is determined by earlier entry time.
- Withdrawal of unexecuted market orders (unexecuted remain of order) and limit orders that have "Immediate or cancel" type.

Start of the trading period

- There may be the pause between end of the auction and start of the main trading period. During the pause participants have opportunity to withdraw their active limit orders
- Limit orders that have "Put into queue" type and was not withdrawn переходят в торговый период



The algorithm for determining the price of opening auction

Step 1

On the basis of limit orders the aggregate demand (quantity of base currency) is calculated in order of decreasing prices cumulatively for each value price and aggregate supply (quantity of base currency) is calculated in order of increasing prices cumulatively for each value price. Each aggregated demand / supply volume is added to the existing market orders at the current price.

Step 2

For each price level the possible quantity of base currency that may be the subject of transactions is determined as a minimum of two values - the value of aggregate demand and aggregate supply quantities specified in **Step 1**

Determined the values of the price, which provides a conclusion of the maximum possible volume of transactions in lots

Step 3

1. If these conditions are satisfied by more than one value price, then the price at which the amount of imbalance (in lots) is minimal is selected
2. If these conditions are satisfied by more than one value price, the price is selected based on "market pressures" (a sign of imbalance): imbalance in the demand side is the highest price, imbalance in the supply side is the minimum price
3. If these conditions are met by several price values, the price closest to the closing price of the previous day is selected. If there are several prices, the bigger price is taken.

Opening auction price **will not be determined** in the following cases:

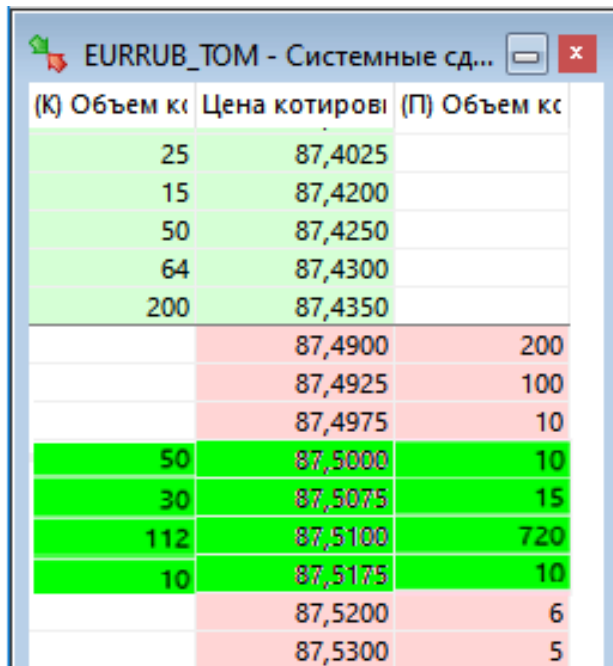
- At the moment of the auction price determining Order book contains market orders only
- Order book have spread and do not cross, or Order book is empty

See Appendix for examples of determining prices of opening auction

Market Data

- Information on current active orders from all participants:

Example of Order book during the Opening auction



(К) Объем кс	Цена котиров	(П) Объем кс
25	87,4025	
15	87,4200	
50	87,4250	
64	87,4300	
200	87,4350	
	87,4900	200
	87,4925	100
	87,4975	10
50	87,5000	10
30	87,5075	15
112	87,5100	720
10	87,5175	10
	87,5200	6
	87,5300	5

- Real-time data per indicative parameters of Opening auction:
 - current indicative price of Opening auction (Opening price after end of auction)
 - current indicative trade volume (Auction trade volume after end of auction)
 - imbalance (difference between aggregated demand and supply with current indicative)
 - data per current Total demand and Total supply



APPENDIX

Examples of the algorithm for determining prices of opening auction

Example of the algorithm for determining the price of opening auction (1)

Definitive determination of Opening auction price (EURRUB_TOM) based on maximum volume:

Buy			Sell			
Aggregated Buy	Buy	Price	Sell	Aggregated Sell	Volume	Imbalance
		90,24	1000	6000		
3000	3000	90,23	3000	5000	3000	2000S
4000	1000	90,22	2000	2000	2000	2000B
6000	2000	90,21				

Opening auction price = **90.23 rub/eur**



Example of the algorithm for determining the price of opening auction (2)

Opening auction price (EURRUB_TOM) is determined using imbalance minimization criteria:

Buy			Sell			
Aggregated Buy	Buy	Price	Sell	Aggregated Sell	Volume	Imbalance
		MO*	20000			
5000	5000	90,22	10000	45000	5000	40000S
10000	5000	90,21	5000	35000	10000	25000S
25000	15000	90,20	5000	30000	25000	5000S
35000	10000	90,19	5000	25000	25000	10000B

* - Market Order

Opening auction price = **90.20 rub/eur based on minimization criteria**



Example of the algorithm for determining the price of opening auction (3)

Opening auction price (EURRUB_TOM) is determined using "market pressure" criteria:

Buy			Sell			
Aggregated Buy	Buy	Price	Sell	Aggregated Sell	Volume	Imbalance
5000	5000	MO	50000	225000	5000	220000S
5000		90,22	35000	225000	5000	220000S
20000	15000	90,21		190000	20000	170000S
35000	15000	90,20	50000	190000	35000	155000S
55000	20000	90,19	35000	140000	55000	85000S
65000	10000	90,18		105000	65000	40000S
65000		90,17	55000	105000	65000	40000S

Imbalance on the Sell side indicates that total demand is less than total supply. Opening auction price = **90.17 rub/eur**



Example of the algorithm for determining the price of opening auction (4)

Opening auction price (EURRUB_TOM) can not be determined using criteria described above:

Buy			Sell			
Aggregated Buy	Buy	Price	Sell	Aggregated Sell	Volume	Imbalance
5000	5000	MO	15000	60000	5000	55000S
10000	5000	90,22		60000	10000	50000S
25000	15000	90,21	5000	60000	25000	35000S
35000	10000	90,20	10000	55000	35000	20000S
40000	5000	90,19	5000	45000	40000	5000S
45000	5000	90,18	5000	40000	40000	5000B
45000		90,17	20000	35000	35000	

Opening auction price is selected as the nearest value to price of the last trade of the previous trading day



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–changes in (a) domestic and international legislation and tax regulation and (b) state policies related to financial markets and securities markets;

–competition increase from new players on the Russian market;

–the ability to keep pace with rapid changes in science and technology environment, including the ability to use advanced features that are popular with the Company's and its subsidiaries' customers;

–the ability to maintain continuity of the process of introduction of new competitive products and services, while keeping the competitiveness;

–the ability to attract new customers on the domestic market and in foreign jurisdictions;

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