

APPROVED

Executive Board  
CCP NCC  
24 September 2020 (Minutes No. 42)

Chairman  
Executive Board  
CCP NCC

\_\_\_\_\_ E. Astanin  
L.S.

**CCP NCC RISK METHODOLOGY FOR  
MOSCOW EXCHANGE EQUITY & BOND MARKET AND DEPOSIT MARKET**

Moscow  
2020

---

## Contents

1. Terms and definitions .....	3
2. General provisions .....	7
3. Risk management system parameters .....	7
4. Basic principles of the Market and Interest Risk Rates calculation .....	7
5. Concentration limits definition .....	8
6. Price evaluation calculation algorithm for shares and general collateral certificates .....	8
7. Market Risk Rate calculation algorithm .....	10
8. Gross Price evaluation calculation algorithm for bonds .....	12
9. Market Risk Rate calculation algorithm for bonds .....	15
10. Calculation of the Upper and Lower Limits of the Market Risk Assessment Range.....	17
11. Calculation algorithm of the Price Band upper and lower limits.....	17
12. Repo transactions parameters.....	19
13. Settlement Repo Rate calculation algorithm .....	19
14. Interest Risk Rate calculation algorithm .....	21
15. Calculation of the Upper and Lower Limits of the Interest Risk Assessment Range .....	23
16. Calculation algorithm for upper and lower limits of the Repo Rate Band .....	23
17. Price Band and Repo Rate Band limits move during market hours (widening of the bands).....	24
18. Moving the Market Risk Assessment Range limits during market hours .....	25
19. Moving the Interest Risk Assessment Range limits during market hours .....	26
20. Rollover Rate calculation algorithm .....	26
21. Acceptance of foreign currency as collateral on the Equity & Bond Market and Deposit Market .....	27
22. Establishing balancing trades prices on the Equity & Bond Market and Deposit Market .....	27

## 1. Terms and definitions

1.1. This Risk Methodology uses the following terms and definitions:

<b><i>Rollover rate</i></b>	The repo rate used to settle Trades T+ with an insufficient amount of cash/securities to perform obligations.
<b><i>Volatility</i></b>	A measure used to estimate the repo rate or security price variability. Its quantitative estimate is a standard deviation of repo trades rates or a relative deviation of security prices on Moscow Exchange over the Risk Assessment Period.
<b><i>Risk Parameter Calculation Time</i></b>	The time as of which risk parameters are calculated. This time is set to be 19:00 MSK in this Methodology.
<b><i>Interest Risk Assessment Range</i></b>	A range of interest rate values used by the Clearing Center to evaluate the interest risk of trades without full collateral required.
<b><i>Market Risk Assessment Range</i></b>	A range of security price values used by the Clearing Centre to evaluate the market risks of trades without full collateral required. There are three levels of the Range limits.
<b><i>Repo Discount</i></b>	A discount applied to the Security Price evaluation accepted as collateral in repo trades to determine the price of the first leg of the repo transaction.
<b><i>Repo Rate Band</i></b>	A range of repo rate values outside which member firm cannot submit orders for repo transactions on the Exchange.
<b><i>Clearing Center</i></b>	Non-banking credit institution - Central Counterparty National Clearing Centre.
<b><i>Concentration Limits of the 1st and 2nd levels</i></b>	Limits determining a net obligation (net claim) of a Clearing Member under a certain settlement code with the 1 <sup>st</sup> , 2 <sup>nd</sup> and 3 <sup>rd</sup> Levels of the Market Risk Rates applied. Expressed in number of securities.
<b><i>Risk Assessment Period</i></b>	A period considered by the Clearing Centre as sufficient to detect and settle cases of a Clearing Member's failure to perform (perform improperly) its obligations under the trade and/or margin claims. There are three levels of Risk Assessment Periods.
<b><i>Clearing Rules</i></b>	The Clearing Rules of Bank "National Clearing Centre" (Joint-stock company).
<b><i>Repo Rate Evaluation</i></b>	A rate determined by the Clearing Center based on repo trades executed during a Trading Day on the MOEX Main Market Sector. It is used to set upper and lower limits of the Repo Rate Interval and upper and lower limits of the Interest Risk Assessment Range. The rate is set individually for every security.
<b><i>Price Evaluation</i></b>	Price used to set values of the upper and lower limits of the Price Band and upper and lower limits of the Market Risk Assessment Range.
<b><i>Inter-product spread discount</i></b>	Reduction in the total value of the Market Risk attributable to securities in the same spread group/umbrella group.
<b><i>Interest Risk Rate</i></b>	Possible change of the Settlement Repo Rate over the Risk Assessment Period subject to a given confidence level.

<b>Market Risk Rate</b>	Possible change of the Estimated Price over the Risk Assessment Period subject to a given confidence level. There are three levels of the Market Risk Rate.
<b>Trading Day</b>	Trading Day as determined in the Moscow Exchange Trading Rules for the Equity and Bond as well as Deposit Markets.
<b>Price Band</b>	The range between which prices of order book and off order book orders can fluctuate. When orders prices approach the Price Band limits, the Market Risk Assessment Range is moved.
<b>NSD Valuation Center</b>	The arm of NSD that estimates the value of financial instruments.
<b>Qualified CCP Requirements</b>	The Bank of Russia's Regulation No. 658-P On the Requirements for a Qualified Central Counterparty, the Procedure for Recognition of Central Counterparty Management Quality as Satisfactory; on the Grounds and the Decision-Making Procedure for Recognition of Central Counterparty Management Quality as Unsatisfactory; on the Procedure for Informing the Central Counterparty of the Decision dated 1 November 2018.

- 1.2. Any terms not expressly defined herein have the meanings ascribed to them by the laws and regulations of the Russian Federation, regulations of the Bank of Russia, internal documents of the NCC Clearing Bank, and the Trading Rules of the Moscow Exchange for the Equity and Bond Market.
- 1.3. This Methodology contains the following conventions (any suffixes is referred to as a Trading Day and given on the assumption that the risk parameters are estimated at the Risk Parameter Calculation Time on day  $i$ ):

No	Parameter	Convention
1	Trading Day during which risk parameters are determined for the next Trading Day (the suffix).	$i$
	Foreign currency	$VAL$
2	Number of calendar days between the settlement date of the trade executed on the Central Order Book T+ and current Trading Day (the superscript)	$k$
3	Price evaluation in RUB (for shares, general collateral certificates and bonds). It includes also accumulated interest in case of a bond.	$P_i$
4	Net price evaluation of a bond, in percentage of its face value.	$P\_stlmnt_i$
5	Aggregated prices of best bids and best asks at the time of risk parameter calculation. In RUB for shares; % of face value for bonds.	$BID_i, ASK_i$
5.1	Prices of best bids and best asks with T0 settlement code at the time of risk parameter calculation. In RUB for shares; % of face value for bonds.	$BID0_i, ASK0_i$
5.2	Prices of best bids and best asks on the Central Order Book T+ at the time of the risk parameter calculation. In RUB for shares; % of face value for bonds.	$BIDN_i, ASKN_i$
5.3	Best bids and best asks at time t. In RUB for shares; in % of face value for bonds.	$BID\_t, ASK\_t$
6	Best rates in orders of cash borrowers and orders of cash lenders at the time of risk parameter calculation. In % per annum.	$RR\_BID_i, RR\_ASK_i$
7	Aggregated price of the last trade at the time of risk parameter calculation (the closing price).	$P\_close_i$
7.1	Prices of last trades with T0 settlement code at the time of risk parameter calculation.	$PO\_close\_i$
7.2	Prices of last trades on the Central Order Book T+ at the time of risk parameter calculation.	$PN\_close\_i$
8	Relative change of price evaluation, in %.	$r_i$
9	Weighing ratio used to calculate Volatility (determined at the moment of risk parameter calculation on day $i$ ).	$a_i$

10	Holiday factor.	$G_i$
11	Security volatility (in the Risk Assessment Period).	$\sigma_i$
12	Tentative Market Risk Rate.	$S_i^p$
13	Estimated Market Risk Rate.	$V_i$
14	Weighted average ("net") price of the bond. In % of the face value.	$P\_wa_i$
15	Accumulated interest. In currency of the face value.	$HKZ_i$
16	Cash flows from a bond, including coupon payments, amortisation, face amount payment in $t$ years after the risk parameter calculation. In currency of the face value.	$CashFlow_i(t)$
17	Bond liquidity by the end of day $i$ .	$l_i$
18	Smoothed liquidity of a bond by the end of day $i$ .	$L_i$
19	Smoothed liquidity of a bond Issuer by the end of day $i$ .	$L\_issuer_i$
20	$t$ -year risk-free yield derived from the zero-coupon yield curve for government bonds, by currency of the face value.	$G_i(t)$
21	Trading volume of a bond on day $i$ on the Central Order Book. In settlement currency.	$Volume_i$
22	Z-spread of a bond by the end of trading day $i$ .	$Z\_wa_i$
23	Z-spread of a bond issuer by the end of trading day $i$ .	$Z\_issuer_i$
24	Theoretical Z-spread of a bond.	$Z\_theor_i$
25	Theoretical price of a bond.	$P\_theor_i$
26	Settlement Z-spread of a bond.	$Z\_stlmnt_i$
27	Modified duration of a bond.	$MDur_i$
28	Modified duration of an issuer's debt.	$MDur\_issuer_i$
29	G-curve volatility for currency of the face value.	$\sigma\_curve_i$
30	Z-spread volatility.	$\sigma\_z_i$
31	Market risk rate, Level 1 (2, 3), % of the price evaluation.	$S\_1(2,3)_i$
32	Upper limit of the Price Band. In RUB for shares; in % of the face value for bonds.	$PcH_i^k$
33	Lower limit of the Price Band. In RUB for shares; in % of the face value for bonds.	$PcL_i^k$
34	Market risk assessment range, Upper limit, Level 1 (2,3). In RUB.	$PtH\_1(2,3)_i$
35	Market risk assessment range, Lower limit, Level 1 (2,3). In RUB.	$PtL\_1(2,3)_i$
36	Settlement Repo Rate for T period in VAL currency. % per annum.	$REPOrate(T, VAL)$
40	Rate change.	$r\_IR_i$
41	Tentative Interest Risk Rate.	$\Delta_i^p$
42	Estimated Interest Risk Rate.	$V\_IR_i$
43	Interest risk upward estimate	$H\Delta$
44	Interest rate downward estimate	$L\Delta$
45	Upper limit of the Repo Rate Band.	$RRcH_i$
46	Lower limit of the Repo Rate Band.	$RRcL_i$
47	Interest risk assessment range, Upper limit. In RUB.	$RRtH\_1(2,3)_i^k$
48	Interest risk assessment range, Lower limit. In RUB.	$RRtL\_1(2,3)_i^k$
49	Repo Discount.	$DiscountREPO_i$
50	Face value of a bond.	$Facevalue_i$
51	Repo transaction term. It is the number of calendar days between the settlement dates of the 1 <sup>st</sup> and 2 <sup>nd</sup> parts of the repo transaction.	$cpokPEPIO_i$
52	Minimum Market Risk Rate, Level 1 (2,3). It is set individually for each security, in % of the price evaluation.	$S\_1(2,3)\_min$

53	Concentration, Limit 1 (2, 3). In number of shares.	$LK_{1(2)}$
54	Maximum Market Risk Rate for shares.	$S_{max_{eq}}$
55	Minimum Market Risk Rate movement (step).	$h$
56	Volatility multiplier determining the confidence level for the Market Risk Assessment Range.	$q$
57	Smoothing coefficient for liquidity factors.	$\alpha$
58	Period to estimate Level 1 (2,3) risks. In days.	$rh_{1(2,3)}$
59	Market liquidity risk rate for shares.	$liq_{eq}$
60	Market liquidity risk rate for bonds.	$liq_{bnd}$
61	Maximum Market Risk for bonds.	$S_{max_{bnd}}$
62	Ratio of Price Band to Market Risk Assessment Range.	$x_{pr}$
63	Ratio of Repo Rate Band to Interest Rate Assessment Range.	$x_{IR}$
64	Minimum movement of the Interest Risk Rate.	$h_{IR}$
65	Market liquidity risk rate for repo transactions, in % per annum.	$liq_{RR}$
66	Minimum upward estimate (interest risk).	$MM\Delta$
67	Minimum downward estimate (interest risk).	$SEC\Delta$
68	Rollover Rate for cash in RUB	$MONEYRate$
69	Rollover Rate for securities	$SECRate$
70	Maximum approximation of best quotes to the Price Band limit. In share of the Price Band for the instrument.	$w$
71.1	The period of time in seconds after which the price band needs to be shifted in the course of trading as, during this period, best bids/asks were as close as possible to the Price Band limit in the Main/After-Hours Trading Session.	$u/u_{evening}$
71.2	Period that meets the following condition: if best quotes are as close as possible to the limit of the Repo Rate Band during such period, the limits are to be reviewed at the end of the period during market hours. In sec.	$u_{IR}$
72	Scale factor used to calculate liquidity ratio of a bond.	$Scale$
73	Scale factor used to calculate the weighting coefficient for the issuer's spread.	$DurScale$
74	Maximum Rollover Rate.	$HSECRate$
75	Minimum Rollover Rate.	$LSECRate$
76	Maximum Rollover Rate subject to dividends	$HSECRate_{div}$
77	Minimum Rollover Rate subject to dividends	$LSECRate_{div}$
78	Dividend tax rate (as per Part 2 of the Clearing Rules for the Equity & Bond as well as Deposit Markets)	$t_{div}$
79	The number of calendar days in a repo transaction with settlement code Y0/Y1, which was executed on the record date for the dividend	$N$
80	The dividend per security in RUB	$Div_i$
81	Maximum fluctuations of orders prices (up and down) during a day (proportionally).	$PcH_{max}$ $PcL_{max}$
82	Attribute of order monitoring (True or False).	$Monitoring$
83	Limit shift coefficient.	$Shift$
84	Attribute of EWMA used to calculate Market Risk Rates (True or False).	$isEWMA$
85	Attribute of EWMA used to calculate Interest Risk Rates (True or False).	$isEWMA_{IR}$
86	Smoothing coefficient used to calculate liquidity factors for a bond. It is set across bonds of one issuer.	$\alpha$
87	Scale coefficient used to calculate liquidity factors of a bond. It is set across bonds of one issuer.	$scale$
88	Scale coefficient used to calculate theoretical Z-spread of a bond.	$DurScale$
89	Attribute of external theoretical prices (True or False). False by default for all securities.	$UseEXTERNAL$
90	Assets/groups in the spread group/umbrella group.	$Group$
91	Discount as percentage for an inter-product spread. Applicable to a spread group/umbrella group.	$Skidka(Group)$
92	The upper limit of the price band in effect during the After-Hours Trading Session	$PcH_{evening}_i^k$

93	The lower limit of the price band in effect during the After-Hours Trading Session	$PcL_{evening}_i^k$
94	Attribute for automatic processing of signals to shift the Price Band limits (can be "True" or "False"). It is set to "False" by default for all securities	<i>Autochange</i>
95	The maximum number of the Price Band limits shafts that can be made after automatic processing of signals to shift the limits during the After-Hours Trading Session.	<i>Autochange_MAX_evening</i>

## 2. General provisions

- 2.1. This methodology has been designed in accordance with the Clearing Rules. It sets out how risk parameters used by the Clearing Center to monitor and manage risks are determined.
- 2.2. The methodology is available on the Clearing Center's website.

## 3. Risk management system parameters

- 3.1. This methodology defines calculation rules for the following risk parameters:
  - Price evaluations (shares and bonds traded without full collateral required, and general collateral certificates);
  - Market Risk Rates;
  - Upper and Lower limits of the Market Risk Assessment Range;
  - Upper and Lower limits of the Price Band;
  - Repo Discount;
  - Concentration limits of the 1<sup>st</sup> and 2<sup>nd</sup> levels;
  - Settlement Repo Rates;
  - Interest risk rates;
  - Upper and Lower limits of the Interest Risk Assessment Range;
  - Upper and Lower limits of the Repo Rate Band.
- 3.2. Other parameters specified in Clause 1.3 hereof, but not listed in Clause 3.1 hereof, are for the technical purpose in calculation risk parameters indicated in Clause 3.1 hereof.
- 3.3. Parameters 3-50 in Clause 1.3 hereof are dynamic measures with their values calculated every Trading Day at the Risk Parameters Calculation Time. The dynamic risk parameters may be changes by the Clearing Center.
- 3.4. Parameters 51-91 and 94-95 in Clause 1.3 hereof are statistical measures with their values determined by the Clearing Center and reviewed if necessary.
- 3.5. Initial values of the dynamic and technical parameters indicated in Clauses 3.2-3.3 hereof are set by the Clearing Center with respect to securities under consideration to be admitted to trading without full collateral required, or to T+ trading, or securities with full collateral required.
- 3.6. Algorithms and parameters given for shares are applicable also to depositary receipts, fund units and ETFs.

## 4. Basic principles of the Market and Interest Risk Rates calculation

- 4.1. Market and Interest Risk Rates are calculated individually for every security which are cleared without full collateral required.  
Collateral requirements for such trades include market and interest risk rates calculated by the Clearing Center and other parameters and conditions specified in the Methodology and/or Clearing Rules and referred to the collateral size including settlement period and terms.
- 4.2. The Clearing Center may calculate the market risk rate for every security admitted to trading on the Moscow Exchange Equity & Bond Market with full pre-funding.  
Collateral requirements for such securities include market risk rate calculated by the Clearing Center as well as other parameters and conditions specified in the Methodology and/or Clearing Rules and referred to the collateral size including settlement period and terms.

- 4.3. The exponential weighting method is used to estimate Volatility in the calculation of the market and interest risk rates.
- 4.4. The Clearing Center sets minimum and maximum Market Risk Rates as well as Minimum Interest Risk Rates.
- 4.5. The Clearing Center sets minimum Market Risk Rates according to the Qualified CCP Requirements.
- 4.6. The Clearing Center may decide to announce Market and Interest Risk Rates that are different from their estimated values subject to ancillary market factors.

## 5. Concentration limits definition

### 5.1. Shares and bonds

- The Level 1 Concentration Limit is the estimated maximum possible position size in a security which can be closed quickly without having a material effect on the security price. The Level 2 Concentration Limit is the estimated maximum possible position size in a security which can be closed within the Level 2 Risk Assessment Period without having a material effect on the security price.
- Concentration limits are set per groups on the basis of trading volumes and expert judgement from the Clearing Center.
- The Clearing Center can adjust concentration subject to ancillary market factors.

### 5.2. General collateral certificates

- Concentration limits are set subject to expert judgement from the Clearing Center.

## 6. Price evaluation algorithm for shares and general collateral certificates

### 6.1. Shares

- To determine the price evaluation of a share, closing prices ( $P_{close}$ ), best asks (ASK) and best bids (BID) in VAL currency available on the order book with T settlement date are converted into RUB currency by using the Central Rates:

$$P_{close_i}(T, VAL, RUB) = P_{close_i}(T, VAL) * Rc_i(VAL)$$

$$ASK_i(T, VAL, RUB) = ASK_i(T, VAL) * Rc_i(VAL)$$

$$BID_i(T, VAL, RUB) = BID_i(T, VAL) * Rc_i(VAL)$$

$$VOLUME_i(T, VAL, RUB) = VOLUME_i(T, VAL) * Rc_i(VAL)$$

where:

$P_{close_i}(T, VAL)$  – the order book closing price with T settlement date and VAL settlement currency;

$ASK_i(T, VAL)$  – the rate of best ask on the order book with T settlement date and VAL settlement currency;

$BID_i(T, VAL)$  – the rate of best bid on the order book with T settlement date and VAL settlement currency;

$Rc_i(VAL)$  – the Central Rate for currency pair VALRUB on the FX Market;

$VOLUME_i(T, VAL, RUB)$  – trading volume in the instrument with settlement in VAL currency. If either BID or ASK is not available or zero, the parameters given in the formulae above are calculated based on expressions with existing BID and/or ASK. If both BID and ASK are not available or zero, the relevant parameter value is deemed not available.

- The values in RUB are aggregated for every VAL currency and T settlement date:



$$P\_close_i = \frac{\sum_{VAL,T} \frac{P\_close_i(T, VAL, RUB)}{1 + \frac{T \times REPOrate_i(T)}{365}} \cdot VOLUME_i(T, VAL, RUB)}{\sum_{VAL} VOLUME_i(T, VAL, RUB)}$$

$$BID_i = \max_{VAL,T} \left[ \frac{BID(T, VAL, RUB)}{1 + \frac{T \times REPOrate_i(T)}{365}} \right]$$

$$ASK_i = \min_{VAL,T} \left[ \frac{ASK(T, VAL, RUB)}{1 + \frac{T \times REPOrate_i(T)}{365}} \right]$$

Where:

$P\_close_i(T, VAL, RUB)$  – the order book closing price with T settlement date as recalculated into RUB;

$REPOrate_i(T)$  – the Settlement Repo Rate on the order book with T settlement date;

$ASK_i(T, VAL, RUB)$  – the best ask price as recalculated into RUB;

$BID_i(T, VAL, RUB)$  – the best bid price as recalculated into RUB;

$VOLUME_i(T, VAL, RUB)$  – order book trading volume with T settlement date as recalculated into RUB;

- If the attribute of external theoretical prices UseEXTERNAL is set to true for a security, prices of ( $BID_i$ ) and ( $ASK_i$ ) are adjusted as follows:

$$BID_i = \max(BID_i; BID\_EXT_i),$$

$$ASK_i = \min(ASK_i; ASK\_EXT_i).$$

Where the parameters are calculated with external data used, and parameters  $BID\_EXT_i$  and  $ASK\_EXT_i$  are given in a currency other than RUB, their values are recalculated into RUB at the rate of the last trade in VALRUB currency pair of the FX Market and Precious Metals Market as at the time of loading data on orders.

- The share price evaluation in RUB  $P_i(RUB)$  is determined by adjusting the share closing price by ( $BID_i$ ) and ( $ASK_i$ ):

$$P_i(RUB) = \text{mid}(BID_i, P\_close_i, ASK_i)$$

If there were no trades resulted from order book orders, the closing price is deemed the previous day's price evaluation. If only selling orders are available, then

$$P_i(RUB) = \min(P\_close_i, ASK_i)$$

If only buying orders are available, then

$$P_i(RUB) = \max(P\_close_i, BID_i)$$

Otherwise,

$$P_i(RUB) = P\_close_i,$$

where

$mid()$  – the function to calculate the median,

$BID_i, P\_close_i, ASK$  – the aggregated price of best bids, closing price and best asks, respectively.

The share price evaluation in VAL currency is determined as follows:

$$P_i(VAL) = \frac{P_i(RUB)}{Rc(VAL)},$$

where

$P_i(RUB)$  – the share's price evaluation in RUB,

$Rc(VAL)$  – the Central Rate of trades in currency pair VALRUB.

- If:
  - The share was not available for trading before,
 

the price evaluation used to determine the price deviation in the central order books (the price evaluation of the market operator) is set to another value than the closing price of the previous day which is calculated according to the Closing Price Methodology set out in the Moscow Exchange Trading Rules for the Equity & Bond and Deposit Markets, if so decided by the market operator.

The Clearing Center sets the Price Evaluation equal to the price evaluation of the market operator.
  - The Clearing Center can set the Price Evaluation other than that determined in accordance with the algorithm described above.

## 6.2. General collateral certificates

- The Price Evaluation for a general collateral certificate equals its principal value and is set to be RUB 1.

## 7. Market Risk Rate calculation algorithm

### 7.1. Shares:

- There are the following three levels of the Market Risk Rates for shares (everywhere in this section, the "Rate"):
- The First Level Rate ( $S_1$ ) is applicable to small-sized positions whose size does not exceed the Concentration Limit of the 1<sup>st</sup> Level ( $LK_1$ ). It is assumed that such positions can be closed out quickly without having a material impact on the security price.  $S_1$  is calculated based on the 1<sup>st</sup> level of the Risk Assessment Period ( $rh_1$ ).  $LK_1$  is calculated on the basis of security liquidity.
- The Second Level Rate ( $S_2$ ) is applicable to medium-sized positions, i.e. whose size is between the Concentration Limits of the 1<sup>st</sup> ( $LK_1$ ) and 2<sup>nd</sup> ( $LK_2$ ) Levels.  $S_2$  is calculated based on the 2<sup>nd</sup> level of the Risk Assessment Period (it is assumed that the position can be closed out within the period  $rh_2$ ).
- The Third Level Rate ( $S_3$ ) is applicable to large-sized positions, i.e. whose size exceeds the Concentration Limit of the 2<sup>nd</sup> Level ( $LK_2$ ).  $S_3$  is calculated based on the 3<sup>rd</sup> level of the Risk Assessment Period (it is assumed that the position can be closed out within the period  $rh_3$ ).
- If the EWMA model application attribute (isEWMA) is set to True, an exponentially weighted moving average (EWMA) volatility estimate is used to determine the Rates for shares.

- The Rates of the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> levels are calculated every Trading Day  $i$  at the Risk Parameter Calculation Time.
- To calculate the Rates of the 1<sup>st</sup> Level ( $S_{-1i}$ ):
- Percentage change  $r_i$  of the Price evaluation is calculated:

$$r_i = \max \left[ \left| \frac{P_i(RUB) - P_{i-2}(RUB)}{P_{i-2}(RUB)} \right|, \left| \frac{P_i(RUB) - P_{i-1}(RUB)}{P_{i-1}(RUB)} \right| \right],$$

i.e. the maximum of the two following values:

- percentage change of the price evaluation over one day;
  - percentage change of the price evaluation over two days.
- Weighting coefficient  $a_i$  is determined.
  - If percentage change  $r_i$  of the price is greater than Volatility estimate  $\sigma_{i-1}$  of the previous Trading Day, then  $a_i = a_{up}$ , or  $a_i = a_{down}$  otherwise:

$$a_i = \begin{cases} a_{up}, & \text{if } r_i > \sigma_{i-1}, \\ a_{down}, & \text{if } r_i \leq \sigma_{i-1}. \end{cases}$$

- If more than one non-trading day occur between Trading Days  $i-2$  and  $i$ , weighting coefficient  $a_i$  is set to zero. In this Methodology, a non-trading day is:
  - any public holiday in Russia if it is a business day in Europe and the US;
  - a non-trading day for a specific instrument, i.e. a day on which the Central Order Book T+ is closed if it is the business day in Russia.
- Non-trading day factor  $G_i$  is determined in the upcoming Risk Assessment Period:

$$G_i = \sqrt{1 + \frac{m_i}{rh_{-1}}}$$

- The parameter  $m_i$  is determined for a specific security as the amount of non-trading days for that security in the upcoming Risk Assessment Period:
- Volatility is adjusted as follows:

$$\sigma_i = \sqrt{(1 - a_i) \cdot \sigma_{i-1}^2 + a_i \cdot r_i^2} \quad (7.1)$$

- If percentage change  $r_i$  of the price exceeds Rate  $S_{-1i-1}$  and just one holiday occurs between Trading Days  $i$  and  $i-2$ , the following value is also calculated along with volatility calculated as per formula (7.1):

$$\sigma_i^* = \frac{r_i}{q} \quad (7.2)$$

In this case, Volatility  $\sigma_i$  is determined as per formula:  $\sigma_i = \max(\sigma_i, \sigma_i^*)$ .

In formula (7.2) and everywhere below, parameter  $q$  is the volatility multiplier determined through a look back analysis and back testing.

- Tentative Rate  $S_i^p$  is determined in accordance with the following algorithm:

$$\text{if } \text{ceiling} \left( \frac{q \cdot \sigma_i}{h} \right) \cdot h \geq S_{i-1}^p + h, \text{ then } S_i^p = \text{ceiling} \left( \frac{q \cdot \sigma_i}{h} \right) \cdot h ;$$

otherwise, if  $\text{ceiling}\left(\frac{q \cdot \sigma_i}{h}\right) \cdot h \leq S_{i-1}^p - h$  and at least n Trading Days pass since the Tentative Rate changed last time, then  $S_i^p = S_{i-1}^p - h$  ;  
 otherwise,  $S_i^p = S_{i-1}^p$ , where ceiling – the function of rounding up to the integer value.

- Minimum Rates, Level 1, 2 and 3 ( $S_{\_1\_min}$ ,  $S_{\_2\_min}$  and  $S_{\_3\_min}$ ) are determined to:  
 Curb the model risk if the Volatility estimate is excessively low for stress scenarios;  
 Prevent trading halt in the event of a too narrow Price Band.

- Estimated Market Risk  $V_i$  is determined subject to its discrete nature and minimum movement h:

$$V_i = \min\left(\text{ceiling}\left(\frac{\max(S_i^p \cdot G_i + liq\_eq; S_{\_1\_min})}{h}\right) \cdot h; S_{\_max\_eq}\right)$$

- Final Market Risk Rate  $S_{\_1_i}$  is set to be the value of Estimated Market Risk Rate  $V_i$  .
- Values of Rates  $S_{\_2_i}$  and  $S_{\_3_i}$  are determined by calculating Volatility in Risk Assessment Periods for risks of 2<sup>nd</sup> and 3<sup>rd</sup> levels subject to Minimum and Maximum Market Risk Rates for shares:

$$S_{\_2_i} = \min\left(\text{ceiling}\left(\frac{\max\left(\sqrt{\frac{rh_{\_2}}{rh_{\_1}}}\right) \cdot (S_i^p \cdot G_i + liq\_eq); S_{\_2\_min}}{h}\right) \cdot h; S_{\_max\_eq}\right)$$

$$S_{\_3_i} = \min\left(\text{ceiling}\left(\frac{\max\left(\sqrt{\frac{rh_{\_3}}{rh_{\_1}}}\right) \cdot (S_i^p \cdot G_i + liq\_eq); S_{\_3\_min}}{h}\right) \cdot h; S_{\_max\_eq}\right)$$

- If attribute isEWMA is set to False, the Market Risk Rates are set to equal the Minimum Market Risk Rate.
- The Clearing Center can set Rates of the 1st, 2nd and 3rd Levels different from their estimated values.

## 7.2. General collateral certificates:

Market Risk Rates for general collateral certificates are set to zero.

## 8. Gross price evaluation algorithm for bonds

- 8.1. The weighted average ("net") prices and orders prices are calculated:

$$P\_wa_i = \frac{\sum_{VAL,T} \frac{P\_wa(T,VAL)}{1 + \frac{T \times REPOrate_i(T)}{365}} \cdot Volume(T,VAL,RUB)}{\sum_{VAL} Volume(VAL,RUB)},$$

$$BID_i = \max_{VAL,T} \left[ \frac{BID(T,VAL)}{1 + \frac{T \times REPOrate_i(T)}{365}} \right]$$

$$ASK_i = \min_{VAL,T} \left[ \frac{ASK(T,VAL)}{1 + \frac{T \times REPOrate_i(T)}{365}} \right]$$

where

$P\_wa(T,VAL)$  – the weighted average (“net”) price of a bond in percentage of its face value by the close of order book trading, with settlement date  $T$ , in currency  $VAL$ ,

$REPOrate_i(T)$  – the order book Settlement Repo Rate with settlement date  $T$ ,

$ASK(T,VAL)$  – the price of the best ask as converted into RUB on the order book with settlement date  $T$ , in currency  $VAL$ ,

$BID(T,VAL)$  – the price of the best bid as converted into RUB, on the order book with settlement date  $T$ , in currency  $VAL$ ,

$VOLUME(T, VAL, RUB)$  – the order book trading volume for the instrument with settlement date  $T$  and currency  $VAL$ , as recalculated into RUB at the Central Rate.

- 8.2. The Z spread  $Z\_wa_i$  is calculated by the close of trading (provided that the bond is traded on this trading day). It is calculated by solving the following equation:

$$\frac{P\_wa_i}{100} \cdot Facevalue_i + HKД_i = \sum_t \frac{CashFlow_i(t)}{(1 + G_i(t) + Z\_wa_i)^t},$$

Where

$P\_wa_i$  - the weighted average price of the bond calculated as per Clause 8.1;

$Facevalue_i$  - the current face value of the bond in the face value currency;

$CashFlow_i(t)$  – cash flow in the face value currency (coupon payment, amortization, principal payment) in  $t$  years after calculation date of the risk parameters;

$G_i(t)$  – the risk-free return of the principal currency for  $t$  years.

- 8.3. If data on prices of sovereign securities denominated in foreign currency is not available, prices of other bonds denominated in that foreign currency may be used to calibrate the risk-free yield curve  $G_i(t)$ .

- 8.4. Liquidity factors for a bond  $(l_i, L_i)$  and issuer  $L\_issuer_i$  are calculated:

$$l_i = \frac{Volume_i}{\exp(scale \cdot abs(Z\_wa_i - Z\_stmnt_{i-1}))} \quad l_i = \frac{Volume_i}{\exp(scale \cdot abs(Z\_wa_i - Z\_stmnt_{i-1}))};$$

$$L_i = \alpha \cdot l_i + (1 - \alpha) \cdot L_{i-1};$$

$$L\_issuer_i = Avg_j(L_{i,j}) \quad L\_issuer_i = Avg_j(L_{i,j}),$$

where

$Avg_j$  - the average liquidity of all bonds of the issuer (bonds denominated in different currencies are considered as bonds of different issuers),

$Volume_i = \sum_T VOLUME_i(T, VAL.RUB)$  - the order book trading volume for the instrument with settlement in currency VAL, as recalculated into RUB at the Central Rate on day  $i$ ;

$\alpha$  - smoothing coefficient for liquidity factors;

$scale$  – the scale factor.

The modified duration of the issuer's debt is calculated as follows:

$$MDur\_issuer_i = \frac{\sum_{IssuerName=Issuer} MDur_{i-1}(IssuerName) \cdot L_i(IssuerName)}{\sum_{IssuerName=Issuer} L_i(IssuerName)}$$

- 8.5. The issuer's Z spread ( $Z\_issuer_i$ ) is calculated subject to trading volume in every bond issue on day  $i$  and the issuer's Z spread on the previous day:

$$Z\_issuer_i = \frac{\sum_j (l_{i,j} \cdot Z\_wa_{i,j}) + Z\_issuer_{i-1} \cdot L\_issuer_{i-1}}{\sum_j (l_{i,j}) + L\_issuer_{i-1}},$$

Where

$\sum_j$  - summing up across all bonds of the issuer that are traded on day  $i$ .

- 8.6. The theoretical Z spread ( $Z\_theor_i$ ) of a bond is calculated as follows:

$$Z\_theor_i = \frac{l_i \cdot Z\_wa_i + Z\_stlmnt_{i-1} \cdot L_{i-1} + Flag \cdot Z\_issuer_i \cdot L\_issuer_i \cdot DurFactor}{l_i + L_{i-1} + Flag \cdot L\_issuer \cdot DurFactor},$$

where  $Flag=0$ , if  $L_i > L\_issuer_i$ , otherwise  $Flag=1$ ,

$$DurFactor = \exp(-DurScale \cdot \text{abs}(MDur_{i-1} - MDur\_issuer_i)),$$

$DurScale$  – the scale factor. If  $DurScale$  was not set for the bond, the default value set by the Clearing Center shall apply.

- 8.7. The theoretical price of a bond is calculated based on the theoretical Z spread ( $Z\_theor_i$ ) and the zero coupon yield curve for government bonds in the principal currency (G curve in the principal currency) as described in Clause 8.2 by substituting  $Z\_wa_i$  for  $Z\_theor_i$ .

- 8.8. The Net p ( $P\_stlmnt_i$ ) of a bond is determined by adjusting the theoretical price by prices of ( $BID$ ) and ( $ASK$ ), as well as by using external data for  $BID\_EXT$  and  $ASK\_EXT$ . Final values of  $BID$  and  $ASK$  are determined as follows:

$$BID = \max(BID\_17; BID\_19; BID\_EXT)$$

$$ASK = \min(ASK\_17; ASK\_19; ASK\_EXT)$$

If bids and asks are available

$$P\_sttlmnt_i = mid(BID_i, P\_theor_i, ASK_i),$$

where

*mid* - the function to calculate the median.

If only asks are available, then  $P\_sttlmnt_i = \min(P\_theor_i, ASK_i)$ .

If only bids are available, then  $P\_sttlmnt_i = \max(P\_theor_i, BID_i)$ . Otherwise,  $P\_sttlmnt_i = P\_theor_i$ .

Orders prices are derived from the Central Order Book T+ data and additional data sources.

If the attribute of external theoretical prices UseEXTERNAL is set to true for a security, then the following values are used instead of  $P\_theor$ :

- $P\_wa_i$ , if any order book trades were executed in the security on day  $i$ ;
- $P\_sttlmnt_{i-1}$ , if no trades were executed.

8.9. The settlement Z spread ( $Z\_sttlmnt_i$ ) of a bond is determined based on its Net Price Evaluation  $P\_sttlmnt_i$  under the algorithm described in Clause 8.12 hereof, by substituting the weighted average ("net") price  $P\_wa_i$  for net price evaluation  $P\_sttlmnt_i$ . Then, risk parameter  $Z\_issuer_i$  is recalculated according to the formula given in Clause 8.5 by substituting parameter  $Z\_wa_i$  for  $Z\_sttlmnt_i$ .

8.10. The Gross Price Evaluation for a bond in the principal currency is calculated as follows:

$$P_i = \frac{P\_sttlmnt_i}{100} \cdot Facevalue_{i+1} + HKД_{i+1}.$$

8.11. The modified duration of a bond is calculated as follows:

$$MDur_i = \frac{1}{\frac{P\_sttlmnt_i}{100} \cdot Facevalue_i + HKД_i} \cdot \sum_t \frac{CashFlow_i(t) \cdot t}{(1 + G_i(t) + Z\_sttlmnt_i)^{t+1}}$$

8.12. When the Gross Price Evaluation in RUB is determined for a bond denominated in foreign currency, spot rates and forward rates of the relevant foreign currency against RUB are taken into account.

8.13. The Gross Price Evaluation in RUB is calculated as follows:

$$P_i(RUB) = P_i(VAL) \cdot Rc_i(VAL),$$

where

$P_i(VAL)$  – the gross Price Evaluation of the bond denominated in VAL,

$Rc_i(VAL)$  – the Central Rate of transactions in VAL with settlement in RUB.

8.14. The Clearing Center can set the gross Price evaluation in RUB different from its value calculated through the algorithm given above.

8.15. For the purposes of further monitoring of Bonds Price evaluations, the Clearing Center may use prices provided by the NSD Valuation Center as part of the service called "Provision of Data on Fair Value of Financial Instruments.

## 9. Market Risk Rate calculation algorithm for bonds

9.1. If the isEWMA model application attribute is set to True, the Interest Rate Volatility is subject to evaluation when the Market Risk Rate for bonds (everywhere in this section, the "Rate") is determined. The Interest Rate Volatility is the sum of EWMA (exponentially weighted moving average) estimates of the Volatility of the zero-coupon yield curve and Volatility of the Z spread.

9.2. Volatility of the G curve ( $\sigma\_curve_i$ ) in the principal currency is calculated similar to the EWMA calculated volatility for shares with a variable  $r_i$  substituted for a variable  $r\_curve_i$  which is recalculated at the close of trading every day as follows:

$$r\_curve_i = \max_j (abs[G\_curve(\theta_j)_i - G\_curve(\theta_j)_{i-1}]; abs[G\_curve(\theta_j)_i - G\_curve(\theta_j)_{i-2}]),$$

Where the maximum value is determined from different terms  $\theta_j$  of the G curve in the principal currency.

9.3. Volatility of the Z spread ( $\sigma\_z_i$ ) is calculated similar to EWMA calculated volatility used to calculate volatility of shares prices with a variable  $r_i$  substituted for a variable  $r\_z_i$ , which is recalculated at the close of trading every day as follows:

$$r\_z_i = \max(abs[Z\_sttlmnt_i - Z\_sttlmnt_{i-1}]; abs[Z\_sttlmnt_i - Z\_sttlmnt_{i-2}]),$$

where  $Z\_sttlmnt_i$  - the settlement value of the Z spread by the end of day  $i$ .

9.4. Bond volatility ( $\sigma_i$ ) is determined as follows:

$$\sigma_i = MDur_i \cdot (\sigma\_curve_i + \sigma\_z_i),$$

where  $MDur_i$  - the modified duration of the bond.

9.5. To determine the Rate of the 1st Level:

- The tentative Rate  $S_i^p$  is calculated using the following algorithm:
  1. if  $ceiling\left(\frac{q \cdot \sigma_i}{h}\right) \cdot h \geq S_{i-1}^p + h$ , then  $S_i^p = ceiling\left(\frac{q \cdot \sigma_i}{h}\right) \cdot h$ ; otherwise
  2. if  $ceiling\left(\frac{q \cdot \sigma_i}{h}\right) \cdot h \leq S_{i-1}^p - h$  and minimum  $n$  Trading Days have passed since the Tentative Rate was changed (the period of the ban on a Market Risk Rate decrease), then  $S_i^p = S_{i-1}^p - h$ ;
  3. otherwise  $S_i^p = S_{i-1}^p$ , where *ceiling* – the rounding function, round up to the nearest integer.
- The estimated rate  $V_i$  is calculated subject to discrete behavior of the Settlement Rate and minimum movement  $h$ :

$$V_i = \min(ceiling\left(\frac{\max(S_i^p \cdot G_i + liq\_bnd; S\_1\_min)}{h}\right) \cdot h; S\_max\_bnd).$$



- The final value of the Rate of the 1<sup>st</sup> Level ( $S_{-1_i}$ ) is set to equal the value of the Estimated Market Risk Rate  $V_i$ .

9.6. The Rates of the 2<sup>nd</sup> ( $S_{-2_i}$ ) and 3<sup>rd</sup> ( $S_{-3_i}$ ) Levels are determined by using Volatility in Risk Assessment Periods with respect to risks of the 2<sup>nd</sup> and 3<sup>rd</sup> Levels subject to the established minimum and maximum Market Risk Rates for bonds:

$$S_{-2_i} = \min\left(\text{ceiling}\left(\frac{\max\left(\sqrt{\frac{rh_{-2}}{rh_{-1}}}\cdot(S_i^p \cdot G_i + liq\_bnd); S_{-2\_min}\right)}{h}\right); S_{-max\_bnd}\right),$$

$$S_{-3_i} = \min\left(\text{ceiling}\left(\frac{\max\left(\sqrt{\frac{rh_{-3}}{rh_{-1}}}\cdot(S_i^p \cdot G_i + liq\_bnd); S_{-3\_min}\right)}{h}\right); S_{-max\_bnd}\right).$$

- 9.7. If the attribute isEWMA is set to false, the Market Risk Rate is set to equal its minimum.
- 9.8. The Clearing Center may set the Rates of the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Levels to be different from their estimated values.

## 10. Calculation of the Upper and Lower Limits of the Market Risk Assessment Range

### 10.1. Shares and bonds

- The Upper Limit of the Market Risk Assessment Range, Level 1 (2,3) is determined as follows as the Price evaluation in RUB plus the Market Risk Rate, Level 1 (2,3):

$$PtH_{-1_i}(RUB) = P_i(RUB) \cdot (1 + S_{-1_i}),$$

$$PtH_{-2_i}(RUB) = P_i(RUB) \cdot (1 + S_{-2_i}),$$

$$PtH_{-3_i}(RUB) = P_i(RUB) \cdot (1 + S_{-3_i}).$$

- The Lower Limit of the Market Risk Assessment Range, Level 1 (2,3) is determined as follows as the Price evaluation in RUB minus the Market Risk Rate, Level 1 (2,3):

$$PtL_{-1_i}(RUB) = P_i(RUB) \cdot (1 - S_{-1_i}),$$

$$PtL_{-2_i}(RUB) = P_i(RUB) \cdot (1 - S_{-2_i}),$$

$$PtL_{-3_i}(RUB) = P_i(RUB) \cdot (1 - S_{-3_i}).$$

- The limits of the risk assessment ranges and Price evaluations for shares are rounded to  $\text{ceiling}[\log_{10}(LotSize)] + 2$ , where *LotSize* – the lot size on the Central Order Book,  $\text{ceiling}[\ ]$  – the function to round up to the nearest integer.
- The limits of the risk assessment ranges and Price evaluations in RUB for bonds are rounded to two decimal places.

### 10.2. General collateral certificates

- The limits of the market risk assessment ranges and Price evaluations for general collateral certificates is set to one (1) rouble.

## 11. Calculation algorithm of the Price Band upper and lower limits

11.1. As for bonds, the Price Band upper ( $PcH_i^k$ ) and lower ( $PcL_i^k$ ) limits are determined as follows:

If Monitoring is set to "No" for a security, then

$$PcH_i^k = \frac{P_i * (1 + PcH\_max) * \left(1 + REPORate_i * \frac{k}{36500}\right) - Carry_i^k - НКД_i^k}{FaceValue_i} * 100$$

$$PcL_i^k = \frac{P_i * (1 - PcL\_max) * \left(1 + REPORate_i * \frac{k}{36500}\right) - Carry_i^k - НКД_i^k}{FaceValue_i} * 100$$

If Monitoring is set to "Yes" for a security, then

$$PcH_i^k = \min \left[ \begin{array}{l} \frac{P_i * \left(1 + \frac{S-1_i}{x\_pr}\right) * \left(1 + RRcH_i * \frac{k}{36500}\right) - Carry_i^k - НКД_i^k}{FaceValue_i^k} * 100; \\ \frac{P_i * (1 + PcH\_max) * \left(1 + REPORate_i * \frac{k}{36500}\right) - Carry_i^k - НКД_i^k}{FaceValue_i} * 100 \end{array} \right]$$

$$PcL_i^k = \max \left[ \begin{array}{l} \frac{P_i * \left(1 - \frac{S-1_i}{x\_pr}\right) * \left(1 + RRcL_i * \frac{k}{36500}\right) - Carry_i^k - НКД_i^k}{FaceValue_i^k} * 100; \\ \frac{P_i * (1 - PcL\_max) * \left(1 + REPORate_i * \frac{k}{36500}\right) - Carry_i^k - НКД_i^k}{FaceValue_i} * 100 \end{array} \right]$$

Where *Carry* is calculated as follows for every day *k* in the range from 1 to DateTN-DateT0:

$$Carry_i^k = \sum_{t=DateT0+1}^{DateT0+k} CashFlow(t) * \left(1 + REPOrate_i * \frac{DateT0+k-t}{36500}\right),$$

- To verify a Bid to execute an OTC Trade in a bond, the upper limit ( $PcH\_otc_i^k$ ) and lower limit ( $PcL\_otc_i^k$ ) of the Price Band are determined as follows:

$$PcH\_otc_i^k = \min \left( PcH_i^k; \frac{P_i * (1 + 0,2) * \left(1 + REPORate_i * \frac{k}{36500}\right) - carry_i^k - НКД_i^k}{FaceValue_i} * 100 \right)$$

$$PcL\_otc_i^k = \max \left( PcL_i^k; \frac{P_i * (1 - 0,2) * \left(1 + REPORate_i * \frac{k}{36500}\right) - carry_i^k - НКД_i^k}{FaceValue_i} * 100 \right)$$

If the limits calculated in this way are negative, they are set to zero.

11.2. During the Main Trading Session, the Price Band's upper and lower limits for shares are determined as follows:

If the Monitoring attribute is set to No for a security, then

$$PcH_i^k = P_i * (1 + PcH\_max),$$

$$PcL_i^k = P_i * (1 - PcL\_max).$$

If the Monitoring attribute is set to Yes for a security, then

$$PcH_i^k = \min \left[ P_i * \left(1 + \frac{S-1_i}{x\_pr}\right) * \left(1 + RRcH_i * \frac{k}{36500}\right); P_i * (1 + PcH\_max) \right],$$

$$PcL_i^k = \max \left[ P_i * \left(1 - \frac{S-1_i}{x\_pr}\right) * \left(1 + RRcL_i * \frac{k}{36500}\right); P_i * (1 - PcL\_max) \right].$$

- The coefficient  $x_{pr}$  is determined based on statistical data on the relation between 2-day change in the security price and the deviation of intraday prices from the Price evaluation within a Trading Day.
  - When it comes to shares traded on boards with settlement in foreign currency, the Price Band limits set in RUB are converted in foreign currency by dividing them by the Central FX Rate.
- 11.3. During the After-Hours Trading Session, the Price Band's upper and lower limits for shares are determined as follows:

$$PcH_{evening_i} = PcH_i$$

$$PcL_{evening_i} = PcL_i$$

Where  $PcH_i$ ,  $PcL_i$  – the price limits as of the end of the Main Trading Session.

The Clearing Center may decide to calculate the Price Band for a share in a special way.

- 11.4. As for general clearing certificates, the Price Band (the upper and lower limits) are not calculated and set.
- 11.5. Where necessary, also due to the information received that the market conditions or securities prices have changed significantly, or the market volatility has increased, the Clearing Center may decide to review one or more Price Band limits set before the start of, or during trading.

## 12. Repo transactions parameters

- 12.1. The Repo Discount is set as follows for anonymous CCP-cleared repo transactions:
- Zero (no discount) for general collateral certificates;
  - According to the following formula for other securities:

$$DiscountREPO_i = \min \left[ 0,3; \text{ceiling} \left( \frac{S_{-1}}{\sqrt{2}}, 2 \right) \right],$$

Where  $\text{ceiling}(\dots, 2)$  – the function to round up to two decimal places.

- 12.2. The discount must be within the range  $[-\min(0,9;3 \times S_{-1}); \min(0,9;3 \times S_{-1})]$  for negotiated CCP-cleared repo transactions.
- 12.3. A price of the first part ( $REPO\_P_i$ ) is set to be the Price evaluation of the security  $P_i$  (RUB) for repo transactions with Y0 settlement date of the first part that is made by the Clearing Center with the firm to roll over the security/cash position.
- 12.4. As for anonymous and negotiated CCP-cleared repo transactions with Yk settlement date, the price of the first part is determined as follows:

$$REPO\_P(Y0) = REPO\_P * (1 - DiscountREPO)$$

$$REPO\_P(Yk) = REPO\_P^k * (1 - DiscountREPO)$$

$$REPO\_P^k = REPO\_P + (FaceValue^k - FaceValue^0) + (HKД^k - HKД^0)$$

## 13. Settlement Repo Rate calculation algorithm

- 13.1. To determine Settlement Repo Rates for key maturity T, the end-of-day values (orders and trades prices) of the order book with maturity T and currency VAL are converted into RUB by using the Central Rates and Central Indicative Rate of swaps as set out in the CCP NCC Risk Parameters Methodology for the Moscow Exchange FX and Precious Metals Markets.
- 13.2. If anonymous CCP-cleared repo transactions were executed in a given security during a trading day, the weighted average Repo Rate in the pertinent currency (REPOrate\_wa(T,VAL)) is calculated as follows for that security:

$$REPOrate\_wa(T, VAL) = \frac{\sum_j (REPOrate_{i,j}(T) \cdot Volume_{i,j}(T, VAL, RUB))}{\sum_j Volume_{i,j}(T, VAL, RUB)},$$

where  $REPOrate_{i,j}$ ,  $Volume_{i,j}$  - the rate and volume of the  $j^{th}$  repo transaction in currency VAL for maturity T on day  $i$ .

- 13.3. The weighted average Repo Rate in currency VAL for maturity T is converted into RUB as follows and rounded to two decimal places:

$$REPOrate\_wa(T, VAL, RUB) = [1 + REPOrate\_wa(T, VAL)] \times \left( 1 + \frac{365 \times SWAPrate(T, VAL)}{Rc(VAL) \times T} \right) - 1,$$

where

$REPOrate\_wa(T, VAL)$  – the weighted average Repo Rate in currency Val for maturity T,

$SWAPrate(T, VAL)$  – the Indicative Rate for swaps VALRUB derived from the FX Market for key maturity T (in RUB),

$Rc(VAL)$  – The Central Rate for currency pair VALRUB.

- 13.4. The volume of repo transactions in currency VAL for maturity T in RUB ( $Volume(T, VAL, RUB)$ ):

$$Volume(T, VAL, RUB) = Volume(T, VAL) \times Rc(VAL),$$

where

$Volume(T, VAL)$  – the volume of repo transactions in currency VAL for maturity T,

$Rc(VAL)$  – the Central Rate of VALRUB trades.

- 13.5. Aggregated central rates for all currencies are calculated.

The weighted average Repo Rate ( $REPO\_wa$ ) for maturity T for all currencies:

$$REPOrate\_wa(T) = \frac{\sum_{VAL} (REPOrate\_wa(T, VAL, RUB) \cdot Volume(T, VAL, RUB))}{\sum_{VAL} Volume(T, VAL, RUB)},$$

where

$REPOrate\_wa(T, VAL, RUB)$  – the RUB weighted average Repo Rate for anonymous transactions in currency VAL for maturity T

$Volume(T, VAL, RUB)$  – volume of repo transactions in currency VAL for maturity T, in RUB.

- 13.6. The Repo Rate ( $REPOrate$ ) for a given security is determined as per the following formula:

$$REPOrate_i = \min(REPOrate\_wa(T); REPOIndex(T); REPOclose)$$

where

$REPOrate\_wa(T)$  – the weighted average Repo Rate across all currencies for maturity T.

$REPOIndex(T)$  – the Repo Indicator set for every security for maturity T. If the CCP Repo Indicator is not available for key maturity, the relevant indicative rate ROISfix (published on the Bank of Russia's website and at [www.roisfix.ru](http://www.roisfix.ru)) is applied; or, if not available, its previous day's value).

$REPOclose$  - the last anonymous repo rate with settlement in RUB as of date T.

- 13.7. The Settlement Repo Rate:

- Is set to equal  $REPOIndex(T)$  for settlement in RUB and key maturity T.

- Is determined as follows for settlement currency VAL (other than RUB) and ley maturity T:

$$REPOrate_i(T, VAL, RUB) = \frac{1 + REPOIndex_i(T)}{1 + \frac{365 \times SWAPrate(T, VAL)}{T \times Rc_i(VAL)}} - 1,$$

where

$REPOIndex_i(T)$  – the Settlement Repo Rate for settlement in RUB for a given security;

$SWAPrate(T, VAL)$  – the Indicative Rate for swaps VALRUB executed on the FX Market for key maturity T;

$Rc(VAL)$  – the Central Rate of trades in VALRUB currency pair.

- 13.8. The Settlement Repo Rate for general collateral certificates issued under asset pools GC Bonds, GC Shares, OFZ and GC Expanded is set to equal the CCP Repo Indicator for shares, bonds and the average CCP Repo Indicator for shares and bonds, respectively, for maturity T.
- If the CCP Repo Indicator is not available for maturity T of GCC repo, the relevant ROISfix (published on the Bank of Russia's website and at [www.roisfix.ru](http://www.roisfix.ru)) is used.
- 13.9. The Clearing Center may change the Settlement Repo Rate if necessary.
- 13.10. The Settlement Repo Rates for maturities between key maturity points are determined through linear interpolation. For maturities over the maximum key maturity, the Settlement Repo Rates are set to equal the last key maturity's rate.

#### 14. Interest Risk Rate calculation algorithm

- 14.1. The Interest Risk Rates are determined for every security admitted to trading on the Central Order Book T+ and GC certificates.
- 14.2. If the EWMA model application attribute (isEWMA\_IR) is set to True, the Interest Risk Rates are determined using an exponentially weighted moving average (EWMA) volatility estimate.
- 14.3. The Interest Risk Rates are calculated for every key maturity T at Risk Parameter Calculation Time on every Trading Day  $i$ .
- 14.4. To calculate the tentative Interest Risk Rate  $\Delta_i^p$ , the following algorithm is used:

- The rate change ( $r\_IR_i$ ) is calculated as the maximum of one- and two-day changes of the Repo Rates:

$$r\_IR_i = \max(\text{abs}[REPOrate_i - REPOrate_{i-1}]; \text{abs}[REPOrate_i - REPOrate_{i-2}]).$$

- The weighting coefficient  $a_i$  is determined.

If the rate change  $r\_IR_i$  is greater than the previous day's Volatility estimate  $\sigma_{i-1}$ ,

then  $a_i = a_{\text{верхняя}}$ , or otherwise  $a_i = a_{\text{нижняя}}$ :

$$a_i = \begin{cases} a_{\text{верхняя}}, & \text{если } r\_IR_i > \sigma_{i-1} \\ a_{\text{нижняя}}, & \text{если } r\_IR_i \leq \sigma_{i-1} \end{cases}$$

- If more than one public holiday occurs between Trading Days  $i-2$  and  $i$ , the weighting coefficient  $a_i$  is set to zero.

- Volatility is calculated as follows:

$$\sigma_i = \sqrt{(1 - a_i) \cdot \sigma_{i-1}^2 + a_i \cdot r_{-IR_i}^2}. \quad (14.1)$$

If the rate change  $r_{-IR_i}$  is greater than the tentative Interest Risk Rate  $\Delta_{i-1}^p$  and maximum one public holiday occurs between Trading Days  $i$  and  $i-2$ , the following value is calculated along with Volatility calculated as per formula (14.1):

$$\sigma_i^* = \frac{r_{-IR_i}}{q}. \quad (14.2)$$

In this case, Volatility  $\sigma_i$  is the maximum value between (14.1) and (14.2).

- The parameter  $q$  in formula (14.2) is the volatility multiplier.
- The tentative Interest Risk Rate  $\Delta_i^p$  is determined through the following algorithm:

$$\text{if } \text{ceiling}\left(\frac{q \cdot \sigma_i}{h_{-IR}}\right) \cdot h_{-IR} \geq \Delta_{i-1}^p + h_{-IR},$$

$$\text{then } \Delta_i^p = \text{ceiling}\left(\frac{q \cdot \sigma_i}{h_{-IR}}\right) \cdot h_{-IR},$$

$$\text{ceiling}\left(\frac{q \cdot \sigma_i}{h_{-IR}}\right) \cdot h_{-IR} \leq \Delta_{i-1}^p - h_{-IR}$$

or, otherwise, if and at least  $n_{-IR}$  Trading Days have passed since the last change in the Tentative Interest Risk Rate (the period of the ban on the Interest Risk Rate decrease),

$$\text{then } \Delta_i^p = \Delta_{i-1}^p - h_{-IR},$$

$$\text{or, otherwise, } \Delta_i^p = \Delta_{i-1}^p,$$

where *ceiling* – the function to round up to the nearest integer.

- To determine the Minimum Upward and Downward Estimates of interest risk, static parameters  $MM\Delta$  and  $SECA$  are set.
- Final Upward and Downward Estimates of interest risk  $H\Delta$  and  $L\Delta$  are determined as follows being rounding to two decimal places:

$$H\Delta_i = \text{ceiling}\left(\frac{\max(\Delta_i^p + liq\_RR; MM\Delta)}{h_{-IR}}\right) \cdot h_{-IR},$$

$$L\Delta_i = \text{ceiling}\left(\frac{\max(\Delta_i^p + liq\_RR; REPOIndex - REPORATE + SECA)}{h_{-IR}}\right) \cdot h_{-IR},$$

where

$liq\_RR$  – the market liquidity risk rate regarding repo transactions,

$h_{-IR}$  – the minimum movement of the Interest Risk Rate.

- 14.5. If the EWMA attribute for interest risk rates ( $isEWMA\_IR$ ) is set to false, the Upward and Downward Estimates are determined respectively as follows:

$$H\Delta_i = \text{ceiling}\left(\frac{MM\Delta}{h_{-IR}}\right) \cdot h_{-IR}$$

$$L\Delta_i = \text{ceiling}\left(\frac{REPOIndex - REPORATE + SECA}{h_{-IR}}\right) \cdot h_{-IR}$$

- 14.6. Interest Risk Rates for maturities between key maturities are determined through linear interpolation (with values in percent per annum being applied). For maturities over the maximum key maturity, the Interest Risk Rates are set to equal the last key maturity's rate.

14.7. The Clearing Center may set Interest Risk Rates different from their estimated values.

### 15. Calculation of the Upper and Lower Limits of the Interest Risk Assessment Range

15.1. The Upper Limit Interest Risk Assessment Range for maturity  $Y_m$  is determined as follows:

$$RRtH(Y_m)_i = (REPOrate(Y_m) + H\Delta(Y_m)_i) * \frac{Y_m}{36500} * P_i(RUB)$$

15.2. The Lower Limit Interest Risk Assessment Range for maturity  $Y_m$  is determined as follows:

$$RRtL(Y_m)_i = (REPOrate(Y_m) - L\Delta(Y_m)_i) * \frac{Y_m}{36500} * P_i(RUB)$$

15.3. Limits of the Interest Risk Assessment Range are rounded to two decimal places for bonds and to the digit position  $\text{ceiling}[\log_{10}(\text{LotSize})] + 2$ , where  $\text{LotSize}$  – the lot size on the Central Order Book.

### 16. Calculation algorithm for upper and lower limits of the Repo Rate Band

16.1. The upper and lower limits of the Repo Rate Band are set to curb interest rates in incoming repo orders. The Repo Rate Band is set individually for every security, settlement currency and settlement code  $Y_m/Y_n$ .

16.2. The upper ( $RRcH_i$ ) and lower ( $RRcL_i$ ) limits of the Repo Rate Band for a security "asset" is determined as follows for every settlement code "Ym/Yn" in currency "VAL":

$RRcH(Y_m/Y_n, \text{asset}, \text{VAL}) =$

$$\left( \frac{36500 + REPOrate(Y_n, \text{asset}, RUB) * Y_n - REPOrate(Y_m, \text{asset}, RUB) * Y_m}{36500 + SWAPCRate(Y_n, \text{VAL}) * Y_n - SWAPCRate(Y_m, \text{VAL}) * Y_m} - 1 \right) * \frac{36500}{Y_n - Y_m} + \frac{H\Delta(Y_n, \text{asset})}{x\_IR}$$

$RRcL(Y_m/Y_n, \text{asset}, \text{VAL}) =$

$$\left( \frac{36500 + REPOrate(Y_n, \text{asset}, RUB) * Y_n - REPOrate(Y_m, \text{asset}, RUB) * Y_m}{36500 + SWAPCRate(Y_n, \text{VAL}) * Y_n - SWAPCRate(Y_m, \text{VAL}) * Y_m} - 1 \right) * \frac{36500}{Y_n - Y_m} - \frac{L\Delta(Y_n, \text{asset})}{x\_IR}$$

where

$RRcH(Y_m/Y_n, \text{asset}, \text{VAL}) / RRcL(Y_m/Y_n, \text{asset}, \text{VAL})$  – the upper/lower limit of the Repo Rate Band for the security "asset" and settlement code "Ym/Yn" with settlement in currency "VAL";

$REPOrate(Y_n, \text{asset}, RUB)$  – the settlement repo rate (in per cent per annum) for the security "asset" and date "Yn" (with settlement in RUB);

$SWAPCRate(Y_n, \text{VAL})$  – the Central Indicative Swap Rate (in %) for date "Yn" (settlement currency VAL);

$x\_IR$  – the coefficient of relation between the Repo Rate Band and the interest risk assessment range;

$Y_m/Y_n$  – calendar days in the settlement code  $Y_n$  ( $Y_m$ );

The final upper and lower limits of the Repo Rate Band for the settlement code  $Y_0/Y_1$  are determined subject to the following conditions:

$$RRcH_i = \min(RRcH(Y_0/Y_1, \text{asset}, RUB); \text{MoneyRate})$$

$$RRcL_i = \max(RRcL(Y_0/Y_1, \text{asset}, RUB); \text{LSECRate})$$

16.3. The coefficient  $x\_IR$  is determined based on statistical data on the relation between 2-day change in the Repo Rate for a security and the deviation of Repo Rates of trades executed based on book orders from the Settlement Repo Rate over a Trading Day.

16.4. The lower limit of the Repo Rate Band for GC certificates has positive values. Non-positive values of such limit obtained under Clause 16.2 are changed for the minimum price step established for the relevant trading regime.

16.5. On the record date for the dividend which is a Trading Day, or on the last Trading Day preceding the record date if the record day is a non-trading day and on the preceding Trading Day, LSEC is replaced with  $\text{LSECRate\_div}$  set based on the dividend as per clause 20.3.

**17. Price Band and Repo Rate Band limits move during market hours (widening of the bands)**

- 17.1. The limits of the Price Band and Repo Rate Band (the "Band Limit") are moved during market hours with regard to a security if the system automatically alerts for the Band Limit move. Alerts are not applicable to securities with the parameter *Monitoring* is set to false.
- 17.2. The Band Limit is not monitored and alerts do not appear for CCP-cleared repo transactions with settlement in foreign currency.
- 17.3. The Clearing Center can choose to remain the Band Limit unchanged if it has been also informed that the market environment remained mainly the same and there were no representative volume of orders and trades.
- 17.4. After the Risk Parameters Calculation Time:
- If *Autochange = False*, the Price Band limits are not shifted apart from shifting aiming at the synchronization with the Derivatives Market risk parameters changed as of the Risk Parameters Calculation Time.
  - If *Autochange = True*, the Price Band limits are shifted until the number of shifts reached the maximum allowed value determined by *Autochange\_MAX\_evening*. After that the limits are not shifted apart from shifting aiming at the synchronization with the Derivatives Market risk parameters changed as of the Risk Parameters Calculation Time.
- 17.5. An alert to move the Price Band limits to ensure orderly pricing of securities on the market is triggered by one of the following events:
- For any period  $k$ , best bid prices on the order book queue have approached the upper limit of the Price Band by the value which is less than  $w * (PcH_i^k - PcL_i^k)$ , and such market situation remained for a period determined by the risk parameter  $u$  in the Main trading Session, or by the value which is less than  $w * (PcH_{evening_i}^k - PcL_{evening_i}^k)$ , and this market condition remained for a period of time determined by the risk parameter  $u_{evening}$  in the After-Hours Trading Session;
  - For any period  $k$ , best ask prices on the order book queue have approached the lower limit of the Price Band by the value that is less than  $w * (PcH_i^k - PcL_i^k)$ , and such market situation remained for a period determined by the risk parameter  $u$ , in the Main trading Session, or by the value which is less than  $w * (PcH_{evening_i}^k - PcL_{evening_i}^k)$ , and this market condition remained for a period of time determined by the risk parameter  $u_{evening}$  in the After-Hours Trading Session;
  - Shifting the Price Band limits for instruments traded concurrently on the central T+ boards with settlement in RUB and foreign currency is triggered by a triggering event occurred at least in one of these boards that requires shifting the Price Band limits. The Price Band limits are shifted simultaneously on all boards with settlement in RUB and foreign currency.
- 17.6. An alert to move the Repo Rate Band limits by period  $k$  to ensure orderly pricing of repo transactions to raise/place cash for period  $k$  is triggered by one of the following events:
- Rates of best orders of cash borrowers on the order book queue have approached the upper limit of the Repo Rate Band by a value that is less than  $\frac{MM\Delta \cdot w_{IR}}{x_{IR}}$  and such market situation has continued for a period determined by the risk parameter  $u_{IR}$ ;
  - Rates of best orders of cash lenders on the order book queue have approached the lower limit of the Repo Rate Band by a value that is less than  $\frac{SECA \cdot w_{IR}}{x_{IR}}$  and such market situation has continued for a period determined by the risk parameter  $u_{IR}$ ;
  - On the boards for repos with the CCP, after the Risk Parameter Calculation Time, triggering events that require shifting the Price Band limits are not monitored and the limits are not shifted.



- 17.7. If the automatic alert does not go off and the price of a security/OTC repo rate for the security is outside the Band Limit or is approaching it by a value that is less than  $\frac{MM\Delta \cdot w_{IR}}{x_{IR}}$ , the Clearing Center may move the Band Limit.
- 17.8. When the decision has been made to move the upper (lower) limits of the Price Bands to ensure orderly pricing of securities on the market, such limits are recalculated as per formula in Clauses 11.1-11.2 subject to the increase of parameter  $S_1$  by  $2 \cdot Shift \cdot S_{1_{i-1}}$ . If the recalculated upper (lower) limit is greater (less) than the limits, than it is set to equal the limits in formulas set out in clauses 11.1-11.2 above.
- The Price Band limits in RUB for shares traded on boards with settlement in foreign currency are converted into foreign currency by dividing those limits by the Central FX Rate.
- If the limit(s) calculated in this manner are negative, they are set to zero.
- 17.9. When the decision has been made to move the upper (lower) limit of the Repo Rate Band by period  $k$ :
- The Interest Rate Assessment Range limits are recalculated as per the algorithm given in Section 19.
  - The Repo Rate Band limits are recalculated as per formulae given in Clause 16.2 by using parameters determined under the algorithm described in Section 19.

### 18. Moving the Market Risk Assessment Range limits during market hours

- 18.1. When the upper (lower) limit of the Price Band of the relevant instrument trading in the T+ Central Order Book is moved, the upper (lower) limits of the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Level Market Risk Assessment Range are also shifted. Price limits and risk limits for shares and bonds are moved in all trading regimes (for any period  $k$ ) after an alert goes off that such moves have took place for order book trading. The limits are moved by

$$\Delta = \frac{2 \cdot Shift \cdot S_{1_{i-1}} \cdot P_{i-1}(RUB)}{x_{pr}},$$

where

$S_{1_{i-1}}$  – the level 1 market risk rate determined on day  $i-1$ .

- 18.2. New values of relevant upper limits of the market risk assessment range are calculated as follows:

$$PtH_{1}^{new} = PtH_{1} + \Delta,$$

$$PtH_{2}^{new} = PtH_{2} + \Delta,$$

$$PtH_{3}^{new} = PtH_{3} + \Delta,$$

where

$PtH_{1}, PtH_{2}, PtH_{3}$  – upper limits of the the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Level Market Risk Assessment Range valid at the time of moving.

- 18.3. New values of relevant lower limits of the market risk assessment range are calculated as follows:

$$PtL_{1}^{new} = PtL_{1} - \Delta,$$

$$PtL_{2}^{new} = PtL_{2} - \Delta,$$

$$PtL_{3}^{new} = PtL_{3} - \Delta,$$

where

$PtL\_1, PtL\_2, PtL\_3$  – lower limits of the the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Level Market Risk Assessment Range valid at the time of moving.

18.4. If the limit(s) calculated in this manner are negative, they are set to zero.

18.5. After the Risk Parameters Calculation Time:

- If *Autochange = False*, the Market Risk Assessment Range limits are not shifted apart from shifting aiming at the synchronization with the Derivatives Market risk parameters changed as of the Risk Parameters Calculation Time.
- If *Autochange = True*, the Market Risk Assessment Range are shifted on a regular manner until the number of shifts reached the maximum allowed value determined by *Autochange\_MAX\_evening*. After that the limits are not shifted apart from shifting aiming at the synchronization with the Derivatives Market risk parameters changed as of the Risk Parameters Calculation Time.

### 19. Moving the Interest Risk Assessment Range limits during market hours

19.1. When an alert goes off that the upper (lower) limit of the Repo Rate Band with settlement codes  $Ym \setminus Yn$  has been moved, additional parameters are recalculated for key maturity  $Yn$ :

$$NewH\Delta(Yn) = H\Delta(Yn) + shift * (RRcH - RRcL),$$

$$NewL\Delta(Yn) = L\Delta(Yn) + shift * (RRcH - RRcL).$$

19.2. Additional parameters for maturity  $Yk$  being different from the key maturities are recalculated through linear interpolation.

19.3. The Interest Rate Assessment Range limits are recalculated as per formulae given in Clauses 15.1-15.2.

### 20. Rollover Rate calculation algorithm

20.1. The rollover rate for RUB is the static parameter *MONEYRate* set to be the same for all securities.

20.2. The rollover rate for securities is calculated as follows:

$$SECRate = \min(RRcL, HSECRate),$$

*HSECRate* – the static parameter to cap the rollover rate. It can be changed during market hours.

20.3. On the record date for the dividend which is a Trading Day, or on the last Trading Day preceding the record date if the record day is a non-trading day and on the preceding Trading Day, *HSECRate* and *LSECRate* are replaced with *HSECRate\_div* and *LSECRate\_div* set based on the dividend amount for shares for which the following parameters are calculated:

$$HSECRate_{div} = \max\left(\min\left(HSECRate; \text{floor}\left(-t_{div} * \frac{Div_i(RUB)}{P_i(RUB)} * \frac{365}{N} * 100\%\right)\right); -999\%\right)$$

$$LSECRate_{div} = \min(HSECRate_{div}; LSECRate)$$

where

*floor* – the function to round down to the nearest integer.

$N$  – the number of calendar days in the repo with  $Y0/Y1$  settlement code and trade date as of the record date.

$t_{div}$  – the dividend tax rate (as per Part 2 of the Clearing Rules for the Equity & Bond and Deposit Markets),

$P(RUB)$  – the stock price evaluation in RUB,

$Div(RUB)$  – the dividend on the stock in RUB.

$Div(RUB)$  for dividends in currency other than RUB is determined as follows:

$$Div(RUB) = Div(VAL) * Rc(VAL)$$

- 20.4. To roll over a repo position in securities, SECRate for that security at the moment the repo transaction (sale-buy transaction) is executed at the rollover rate, is used.

## **21. Acceptance of foreign currency as collateral on the Equity & Bond Market and Deposit Market**

- 21.1. Foreign currency and claims/obligations in foreign currency are treated in the assessment of collateral sufficiency according to the Clearing Rules by using risk parameters described in the FX and Precious Metals Markets Risk Parameter Methodology of CCP NCC.
- 21.2. If the risk parameters are changed before or during market hours on the MOEX FX Market, the new values are applied to assess collateral sufficiency on the Equity & Bond Market and Deposit Market.

## **22. Establishing balancing trades prices on the Equity & Bond Market and Deposit Market**

- 22.1. Where the Clearing Center and a non-defaulting clearing member make a balancing trade to process a default event, the fair market price of the security is set to:
- The last available upper limit of the Price Band which was calculated according to Section 11 above for the settlement date, and in the settlement currency of the balancing trade, if the balancing trades are concluded in securities without orders placed and defaulters have the total net obligation in securities which cannot be satisfied due to insufficiency of securities, in cases set out by the Clearing Rules apart from balancing trades executed as part of close-out netting;
  - The last available lower limit of the Price Band which was calculated according to Section 11 above for the settlement date, and in the settlement currency of the balancing trade, if the balancing trades are concluded in securities without orders placed and defaulters have the total net obligation in cash which cannot be satisfied due to insufficiency of funds, in cases set out by the Clearing Rules apart from balancing trades executed as part of close-out netting;
  - The last available Price Evaluation calculated according to Section 6 and 8 above, in any other cases.
- 22.2. The price determined in clause 22.1 may be adjusted for interest payments for the security as established by the Clearing Center on the basis of public information on corporate events, or for other value set by the center on the basis of other information on corporate actions that may influence the security price, including information on:
- The date when a person must be on the issuer's records in order to be eligible for receiving money or other assets including dividends, interest or principal payments from the issuer or an entity granting the security (the record date);
  - The date when a person must be on the issuer's records in order to be eligible for early redemption of a bond;
  - The date when holders of securities are recorded for a mandatory buyback offer pursuant to the Federal Law "On Joint Stock Companies".
- 22.3. Prices determined in Clauses 22.1 and 22.2 and used by the Clearing Center to execute balancing trades with non-defaulting clearing members, are published on the Clearing Center's website.