

KASE CLEARING CENTER JSC

Approved

by decision of the Board of Directors of
KASE Clearing Center JSC

(minutes of the meeting
dated December 22, 2023 No. 20)

Effective

from December 25, 2023

METHODOLOGY

for calculation of projected values of clearing funds

Almaty City

2023

This Methodology has been developed subject to the Rules for clearing activities under transactions with financial instruments (hereinafter referred to as the Clearing Rules), other internal documents of KASE Clearing Center JSC (hereinafter referred to as the Clearing Center) and determines the procedure for calculation of projected values of clearing funds on the stock market, foreign exchange market and derivatives market for internal purposes of the Clearing Center.

Chapter 1. GENERAL PROVISIONS

1. This Methodology uses the notions defined by the Clearing Rules and other internal documents of the Clearing Center, as well as:
 - 1) **projected value of the clearing fund** – an expected size of the clearing fund in tenge on a separate exchange market;
 - 2) **clearing fund** – funds of the guarantee fund and reserve fund on a separate exchange market (stock, foreign exchange, derivatives);
 - 3) **responsible subdivision** – Market Risk Unit of the Clearing Center.
2. Funds of clearing funds shall be intended to cover:
 - 1) market risks, liquidity risks, as well as systemic risks in conditions of increased volatility of prices of financial instruments subject to the Clearing Rules;
 - 2) outstanding obligations under transactions with financial instruments of a certain exchange market for which this reserve fund was formed, subject to the Clearing Rules.
3. Projected value of the clearing fund shall be used to calculate dividends in the manner determined by the dividend policy.
4. In order to calculate projected values of the clearing fund, data shall be used from past and current periods, forecast data on trading volumes and transactions with financial instruments on each exchange market, as well as data on future placements of securities of the Ministry of Finance of the Republic of Kazakhstan (if available) and values of indicators for the revenue part of the budget of the Clearing Center.
5. In order to calculate a projected value of the clearing fund, the following shall be used: approximation of the data specified in clause 4 of this Methodology, and determination of adjustment factors to such data of the current period or forecast data (if available on the date of the calculation) according to the formula specified in clause 9 of this Methodology.

Type of function for approximation shall be determined by the responsible subdivision and shall be submitted by it to the Market Risk Committee (hereinafter referred to as the Committee) to make a relevant decision.
6. Projected value of the clearing fund shall be calculated for the next ten-year period and shall be determined for each exchange market.
7. Calculation of the projected value of the clearing fund shall be carried out by the responsible subdivision and shall be provided to interested subdivisions upon their request.
8. The responsible division shall have the right to request from other divisions information necessary to calculate the projected value of the clearing fund, which shall be provided within the timeframe specified in the request.

Chapter 2. CALCULATION OF PROJECTED VALUES OF CLEARING FUNDS

9. Based on values of the past and current periods specified in clauses 10 and 11 of this Methodology, depending on a type of the exchange market, the correlation coefficient shall be determined using the following formula, which must be at least 90%:

$$Corr = \frac{\sum(x - \bar{x})(y - \bar{y})}{\sqrt{\sum(x - \bar{x})^2 \sum(y - \bar{y})^2}}$$

x – values set out in clause 11 of this Methodology;

y – values set out in clause 10 of this Methodology.

If the correlation coefficient is below 90%, the responsible subdivision shall submit to the Committee the question of the possibility of using the selected values provided for in clauses 10 and 11 of this Methodology.

10. Values used to determine the correlation coefficient may include, but shall not be limited to:
 - 1) for the foreign exchange market – volume of foreign exchange SWAP transactions, volume of purchase and sale of foreign currency;
 - 2) for the stock market – volume of repo transactions, volume of purchase and sale of financial instruments;
 - 3) for the derivatives market – volume of purchase and sale of derivative financial instruments.
11. Values used to determine the correlation coefficient may include, but shall not be limited to:
 - 1) for the foreign exchange market – money supply in the Republic of Kazakhstan and volume of exports;
 - 2) for the stock market – volume of placements of the Ministry of Finance of the Republic of Kazakhstan and the number of financial instruments for which trading is open;
 - 3) for the derivatives market – the number of derivative financial instruments for which trading is open.
12. To calculate the projected values of the parameters specified in clause 11 of this Methodology, the equation of polynomial trend or logarithmic trend or linear trend shall be used.

In this case, the approximation of the values specified in clause 11 of this Methodology shall be carried out by the method of finding the smallest indicator of the sum of square deviations of the calculated indicators from the actual ones.

13. The above trend equations can look like:

$$x_n = aY_n^3 + bY_n^2 + cY_n + d \text{ (cubic equation, polynomial trend);}$$

$$x_n = aY_n^2 + bY_n + c \text{ (quadratic equation, polynomial trend);}$$

$$x_n = a * \ln(Y) + b \text{ (logarithmic trend equation);}$$

$$x_n = aY_n + b \text{ (linear equation, linear trend), where}$$

x_n – projected values specified in clause 11 of this Methodology;

y – future dates (in YYYY format);

a,b,c,d – coefficients of the above trend equations.

To form the above-described trend equations, the method of searching for parameters a, b, c, d shall be used, which provide the best value of the criterion for matching vectors of actual sample values and vectors of estimated values.

As a criterion for compliance, the weighted sum of squared deviations shall be used between the actual values set out in clause 11 of this Methodology and model values, according to the above trend equations, where the weighted sum of squared deviations is determined by the formula:

$$\operatorname{argmin}_{a,b,c,d} \sum (x_{\text{model}_i(a,b,c,d)} - x_{\text{fact}_i})^2, \text{ where}$$

x_{fact} – a vector of actual values, a representative sample, specified in clause 11 of this Methodology;

x_{model_i} – a vector of estimated values according to the above trend equations, specified by parameters a, b, c, d , and dimension of the vectors shall be equal to the sample size.

14. If, based on one of the obtained trend equations, value of the coefficient of determination R^2 (an

indicator used in mathematical statistics that characterizes quality of approximation and varies from zero ("lowest quality") to one ("highest quality") is less than 0.6, the responsible subdivision shall submit the question of the possibility of using such trend level to the Committee for study.

15. Correction factor shall be calculated as a ratio of values specified in clause 10 of this Methodology to values specified in clause 11 of this Methodology.
16. Based on the correction factor and values obtained from trend equations, the projected values specified in clause 10 of this Methodology shall be calculated.

Based on results of these projected values, total volume of trading and transactions with financial instruments on each exchange market shall be determined.

17. Projected value of the clearing fund shall be determined by the following formula:

$$CfFut = UlossN_{max\ t_i} * \left(\frac{Val_{t_i} - Val_{t_{i-1}}}{Val_{t_{i-1}}}\right), \text{ where}$$

CfFut – projected value of the clearing fund on a separate exchange market for a certain year *t*;

UlossN_{max ti} – sum of maximum losses of clearing participants on a separate exchange market;

Val_{t_i} – projected total volume of trading and transactions with financial instruments on each exchange market, calculated subject to clause 16 of this Methodology;

t – vector of future dates for which the *CfFut* parameter must be determined;

i – a specific exchange market.

18. When determining the projected value of the clearing fund, the following assumptions shall be used:

- 1) structure of open positions of the clearing participants in terms of instruments and their terms, as well as rates of market and interest rate risks corresponds to the actual ones on the date of formation of forecast clearing funds;
- 2) the amount of guarantee contributions of the clearing participants corresponds to the actual amount on the date of formation of forecast clearing funds.

Chapter 3. FINAL PROVISIONS

19. Responsibility for implementation of this Methodology and introduction of changes and/or additions to it shall be borne by the responsible subdivision.
20. This Methodology shall be updated as necessary, but at least once every three years counted from the date of approval of this Methodology.

Chairperson of the Management Board

Khoroshevskaya N.Yu.