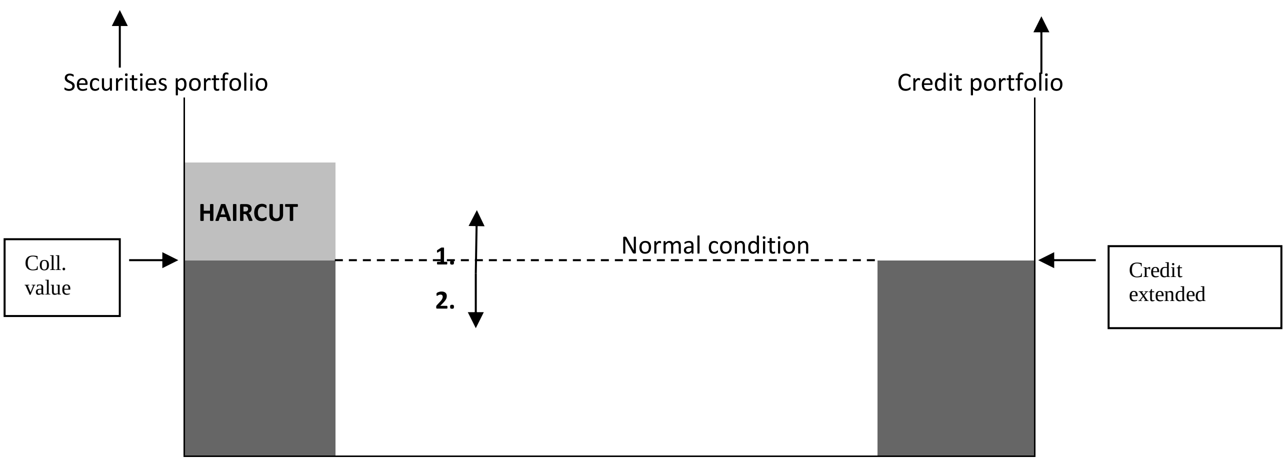
Budapest, 28. June 2019

Description of the Collateral Management System of the MNB

In the collateral management of the MNB, the portfolio of the client's collateralised credit transactions is secured by the securities portfolio pledged for the MNB by KELER Zrt. (pooled collateral management). Thus, the intraday credit line, one-day loans and longer than one day loans, primarily serving monetary purposes, ensuring the smooth functioning of the payment system, are covered by a single pool of collateral. The methodology of assessment of acceptable securities is defined by the MNB.

The collateral value of the securities portfolio pledged by the client for the MNB at KELER Zrt. and the collateralised credit balances with the central bank are re-valued every day (daily collateral management). At the end of the day, the system compares the existing credit balances to the *collateral value* of the securities portfolio. Additional collateral is requested (margin call) if the collateral value falls below the re-valued credit balances (Figure 1).

Figure 1: ***Daily collateral management system***



1. Excess coverage (termination of such may be requested by the client)

2. Under-coverage: additional collateral request

Key elements of collateral management

The **acceptance ratio** indicates the percentage of the initial price of the eligible securities pledged to the MNB, at which the MNB accepts them as collateral. For the calculation, the MNB looks for the acceptance ratios under which the MNB bears a minimum risk of loss under ordinary market conditions. If the MNB considers it justified, it may change the acceptance ratio. The MNB shall immediately notify market participants regarding any change in the acceptance ratio.

Haircut is a risk management tool. It is (expressed as a percentage): 100% - acceptance ratio.

Description of the system

Number of instruments acceptable for collateral: J (where j=from 1 to J, and the value of j asset at t time: $C_{j,t}$), which need to be offered by a central bank client in exchange for I number of active transactions (final liquidity for at least one day, including O/N and longer-term credits, but not intraday ones) (where i=from 1 to I, and the value of i transaction at t time is $L_{i,t}$). The relationship between the available liquidity and value of the offered instruments is described below:

$$\sum_{i=1}^{I} L_{i,t} \leq \sum_{j=1}^{J} (1-h_j)*C_{j,t} \qquad (1)$$

where:

- C_j is the initial price of j-th security valued with MNB's valuation methods (based on market price or a yield curve)
- L_i is the value of the i-th central bank credit extended for at least one day, calculated with accrued interest
- h_j is the haircut applied for jth security (percentage)

Let us assume that τ is the time passed between re-valuations. For the MNB, τ=1 day and re-valuation always takes place at the end of the day. At the time $t+\tau$ additional collateral is requested on the basis of the difference calculated in the following manner ($M_{t+\tau}$):

$$M_{t+\tau}=\sum_{i=1}^{I} L_{i,t+\tau} - \sum_{j=1}^{J} (1-h_j)*C_{j,t+\tau} \qquad (2)$$

This shows that the MNB re-values the credits as well in the meantime, and calculates the accrued interest.

Additional collateral is requested if the above difference has a positive value.

In systems **based on pooled collateral valuation**:

- additional collateral is requested if $M_{t+\tau} > 0$
- collateral is refunded (either in cash or by unblocking), if $M_{t+\tau} < 0$.

For the MNB, refund shall not be automatic. A 'refund' may only occur in securities, and the counterparties may be free to propose the unblocking of securities.

Counterparties may propose unblocking of securities, but the MNB must authorise it. The MNB shall only authorise unblocking of securities to the extent that equation (1) remains valid (adjusted with intraday credit during the day). Similarly, if collateral is requested, the MNB requires an amount to be pledged additionally which is required to render equation (1) valid again.

Highest intraday loan amount in systems using pooled collateral valuation (if positive)

$$L= \sum_{j=1}^{J} (1-h_j)*C_{j,t+\tau} - \sum_{i=1}^{I} L_{i,t+\tau} \qquad (3)$$[1].

where: L intraday credit line

The first part of the above formulae is called the *collateral value* of the pledged securities portfolio.

[1] If the client has no secured loan, the intraday credit limit is identical with the collateral value of pledged securities:

$$L= \sum_{j=1}^{J} (1-h_j)*C_{j,t+\tau}$$

End-of-day revaluation

Following the account transactions carried out in the MNB clientaccount management system, clients are informed of their intraday credit line and ICS fund (**ICS fund notice**) broken down by instant credit limit and IG1 credit limit, by the deadline announced in Annexes 2 and 2/a to the present Terms and Conditions. The MNB quantifies the values included in the ICS fund notice already with the revaluated central bank credits (the system accrues interest) and the revaluation of the pledged securities portfolio (values are recorded with the new updated exchange rates).

If the client receives a minimum balance specification in the notice, additional funds need to be pledged, which is indicated separately by the MNB. The size of the minimum balance is defined in a way that the total amount of the payment account pledged with the minimum balance and the collateral value of the collateral portfolio could not drop below the value of central bank collaterised credits (the minimum requirement is met).

Instant loan credit line

If necessary, MNB grants collateralized loans (instant loans) to its non-public sector Customers affected by the prohibition of monetary financing under the MNB Act to ensure prompt settlement. To determine the relevant instant loan credit line, the MNB reduces the value of the normal pool of securities by the amount of the IG1 credit line and the maximum instant loan fee. For the valuation of the securities used as underlying assets for loans, the MNB uses the acceptance values used in the normal collateral valuation.

$$Instant\ loan\ CL = Collateral\ value\ - IG1\ CL\ - maximum\ instant\ loan\ fee$$

Calculation of the maximum instant loan fee

By taking into account the maximum instant loan fee, the amount of the loan fee is covered for 7 calendar days (maximum number of days) at the maximum utilization of the credit line. To calculate the maximum instant loan fee, (collateral value – IG1 credit line) shall be multiplied by (1 – instant discount).

$$maxium\ instant\ loan\ fee = (collateral\ value - IG1\ credit\ line) * (1 - \ instant\ discount)$$

The instant discount value is a function of several factors.

- Maturity: the number of days in the longest, potentially occurring continuous period of a bank holiday (public holiday), which is the maximum theoretical duration of the instant loan.
- Instant loan fee: see Notice[2]

Instant discount value:

$$instant\ discount = \frac{1}{1 + instant\ loan\ fee * \frac{max.number\ of\ days}{360}}$$

The instant discount value shall be rounded down to four decimal places.

[2] https://www.mnb.hu/en/payments/mnb-as-a-bank

ICS fund notices

In the ICS fund notices, the MNB intends to provide all the information necessary for the client to check the figures in its own records, or it can calculate the currently valid intraday credit limit itself, or ICS fund. The client information lists contain the **following information**:

- ICS fund
- closing balance of the bank account
- IG1 credit line
- minimum balance
- instant loan credit line
- overnight collateralised credit
- collaterised credit over one day
- expired forced credit and collection
- overdue central bank receivables
- additional credit
- blocked (maximum) instant loan fee.

Definitions

Acceptance amount: the initial price multiplied by the acceptance ratio. This is the value of securities calculated by the MNB based on the principles of collateral valuation, expressed in HUF, at which the MNB finally accepts the securities as collateral for money market transactions. In order to achieve and retain coverage, the acceptance value (amount) of the offered securities shall continuously be identical or higher than the value of transaction(s) increased by the initial margin (see daily collateral valuation).

Acceptance ratio: the percentage, with which the initial price is multiplied indicating the amount at which the MNB finally accepts the securities for collateral (acceptance value). The acceptance ratio changes in accordance with the maturity and liquidity of the accepted securities.

Collateral value: at the time of pooled collateral valuation, the collateral value of the securities portfolio is identical with the total of the acceptance amounts of securities contained in the portfolio.

Collateralised credit transaction: an active central bank transaction increasing inter-bank liquidity. They involve credits secured with the securities on the securities account managed by KELER Rt., pledged to the MNB.

Collateral portfolio: Securities portfolio serving as collateral. Securities acceptable to the Bank and pledged by authorised Customers of the Bank at the KELER Zrt. with the Bank as the beneficiary, to serve as collateral for intraday, overnight (O/N) and longer-term central bank loans. Only one combined portfolio of each authorised customer may serve this purpose.

Haircut: a risk management tool used by the MNB for collateral valuation (expressed as a percentage of the initial price). Its amount (expressed as a percentage) is 100% - acceptance ratio.

Longer-term collateralised credit: collateralised central bank credits extended for a longer term than O/N primarily for monetary purposes.

Initial price: generally the gross price most typical of the securities (net price + accrued interests) or, if such is not available, a price estimated with a pre-defined procedure or the face value (in HUF) multiplied by the acceptance ratio to indicate the acceptance value of securities. The MNB defines the initial price separately for individual securities groups.

Margin call: request for additional collateral, cf. daily collateral valuation.

Minimum value: the theoretically desired minimum level of the collateral value of the collateral portfolio, which ensures the coverage of MNB receivables. At least this level must be reached with the additional collateral request, or, whenever securities are unblocked, the MNB authorises unblocking of securities only to an extent that the collateral value of the collateral portfolio should not fall below this level. It is identical with the value of the customer's existing secured credit transactions.

Minimum value requirement: a condition ensuring the coverage of the receivables of the MNB, pursuant to which the collateral value of the collateral portfolio of the customer and the balance of the payment account may not drop below the value of the customer's secured credit transactions.

Daily collateral evaluation: The MNB will revaluate the papers deposited as collateral and the value of the central bank credit transactions[3] on every working day. The existing credit portfolio or the value of the portfolios will be compared with the collateral value of the portfolio used as collateral (considering the haircut, too). If the collateral value of the customer's collateral portfolio drops below the value of the revaluated credit transactions, additional coverage may be requested (margin call) or the credit may be repaid. If the collateral value of the collateral portfolio is over the above value, the customer may release the extra collateral.

[3] This means that at the beginning of the deal, the MNB will not ask for collateral for the interest, but revaluate the loan every day, and add the accrued interest to the nominal value.

Intraday credit (overdraft): a collateralised credit, extended and also repaid on the same day, primarily related to the MNB's role in the payment system.

O/N collateralised credit: the MNB's collateralised credit instrument operated based on availability. The MNB extends collateralised credits to its customers for one day without any quantitative limit with a predefined interest rate at the top of the interest bracket. The credits are provided automatically (up to the end-of-day debit balance of the customers' accounts), or they can also be requested separately (in order to fulfil reserve requirements).