

Annex 5

to the Business Terms and Conditions of Bank Accounts Managed by the Magyar Nemzeti Bank, Settlements in forint and foreign exchange and cash transactions

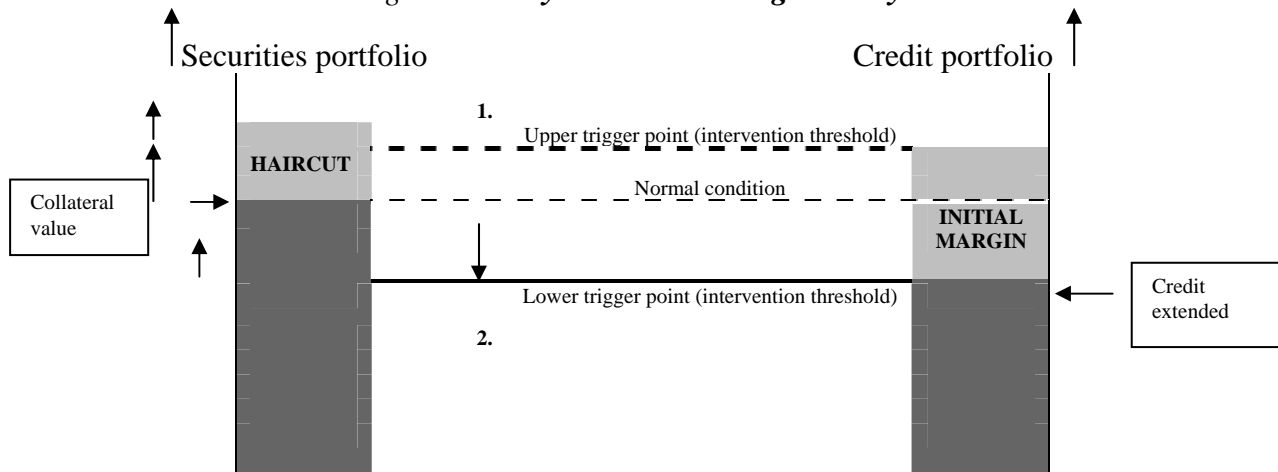
Budapest, 1 August 2007

Description of the Collateral Management System of MNB

In the new system, the portfolio of the customer's collateralised credit transactions is secured by the securities portfolio pledged for the MNB by KELER Zrt.¹ (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 the securities portfolio is defined by the MNB.

The collateral value of the securities portfolio pledged by the customer for the MNB at KELER Zrt. and the collateralised credit balances with the central bank are re-valued every day (daily collateral management). Risk control measures applied to daily collateral valuation are: acceptance ratio, initial margin and intervention threshold. At the end of the day, the system compares the existing credit balances increased by the *initial margin* 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 increased by the initial margin with a pre-defined *intervention threshold* (Figure 1).

Figure 1: Daily collateral management system



1. Excess coverage (termination of such may be requested by the customer)
2. Under-coverage: additional collateral request

¹ KELER Rt. is the Hungarian CSD

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 risk control measures it applies (acceptance ratio, initial margin, intervention threshold).

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

The **initial margin** is an additional risk management tool apart from the acceptance ratio which may require that the collateral value of the securities portfolio pledged to the MNB should cover the **collateralised credit** balances with the central bank increased by the initial margin. The initial margin can be considered a security buffer, which is necessary because the various acceptance ratios for all securities acceptable as collateral cannot be calculated. The instruments have to be grouped and some “rounding” is required for the calculation of the ideal ‘acceptance ratio’.

Depending on the term of credit transactions, the MNB applies various initial margins. Although by applying the haircut the MNB is not expected to incur a loss by withdrawing the collateral due to non-performance, in the case of longer-term credit transactions the probability of default is higher.

The **intervention threshold (trigger)** is an element of the daily collateral valuation system that provides flexibility. With the application of the intervention threshold, the collateral portfolio may not have to be adjusted continuously, because under and excess coverage is allowed up to the intervention threshold. The MNB applies an intervention threshold, identical with the lowest initial margin, thus the initial margin also manages additional risks arising from the intervention threshold.

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 customer 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:

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

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 j th security (percentage)
 m_i is the initial margin for the i -th central bank credit (relating to a given L_i , expressed as a percentage).

Let us assume that τ is the time passed between re-valuations. For the MNB, $\tau=1$ 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 ($M_{t+\tau}$):

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

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

Additional collateral is requested if the above difference is higher than a certain intervention threshold (Figure 2). In systems **based on pooled collateral valuation**:

- additional collateral is requested if $M_{t+\tau} > k * \sum_{i=1}^I L_{i,t+\tau}$
- collateral is refunded (either in cash or by unblocking), if

$$M_{t+\tau} < -k * \sum_{i=1}^I L_{i,t+\tau}.$$

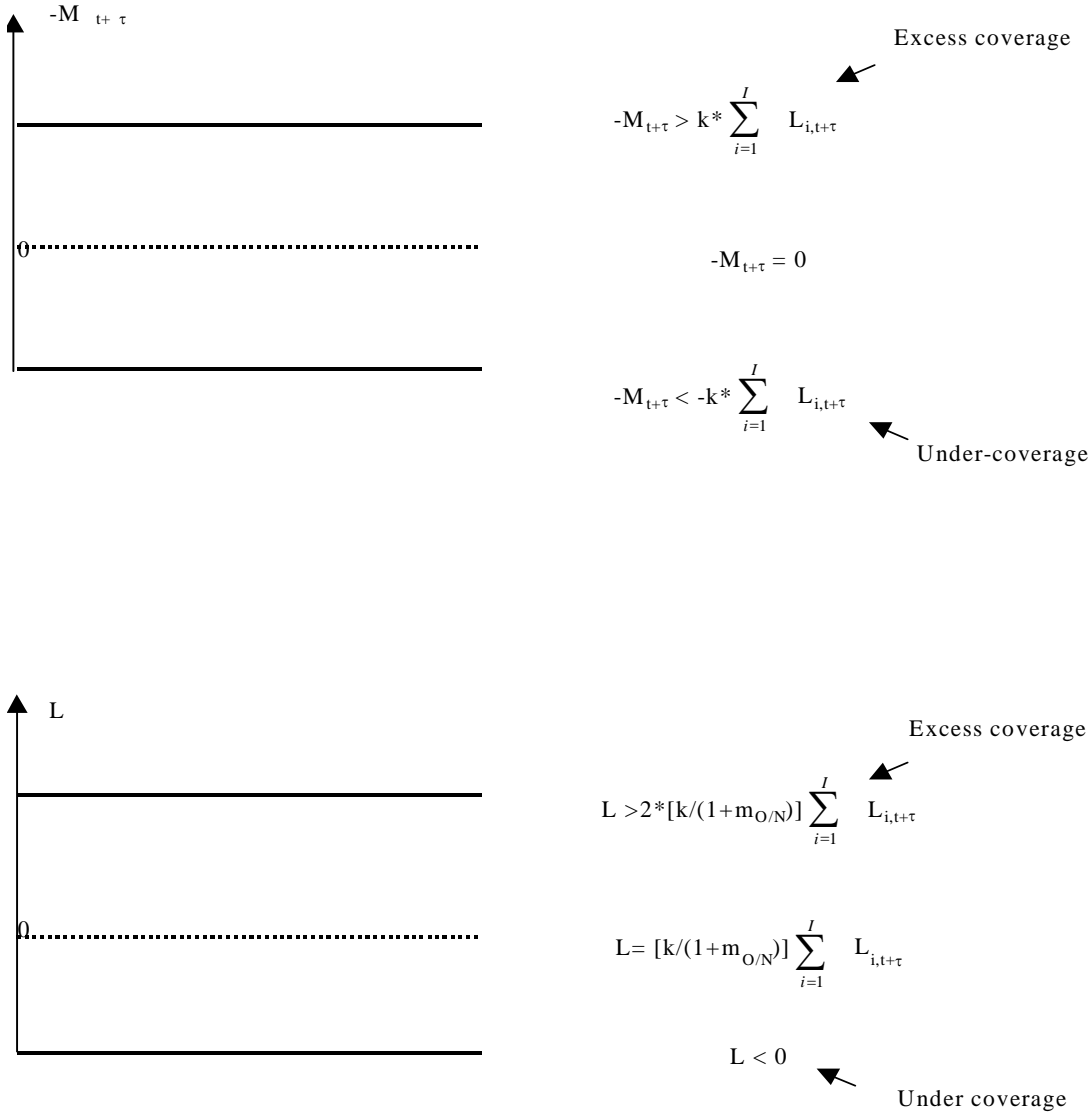
where: k is the intervention threshold (percentage).

For the MNB, refund shall not be automatic. A ‘refund’ may only occur in securities, and the counterparties may be free to propose unblocking of securities (as is currently the case).

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. Similarly, if collateral is requested, the MNB requires an amount to be pledged additionally which is required to render equation (1) valid again. Any automated procedures incorporated in the daily and pooled collateral revaluation (additional collateral request, maximum acceptable unblocking) will adjust the intraday credit line to the so-called *minimum value*, derived from equation (1). As the MNB does not refund collateral automatically, the *estimated* intraday credit line will in fact be higher than the minimum value, which also means that the estimated frequency of additional collateral request will decrease.²

² With pooled collateral valuation, the probability of additional collateral request will be reduced significantly anyway.

Figure 2: Operation of the collateral management system of MNB



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

$$L = (-M_{t+\tau} + k * \sum_{i=1}^I L_{i,t+\tau}) / (1 + m_{O/N}) \quad (3)$$

where: L intraday credit line

$m_{O/N}$ initial margin for O/N loans (percentage).

After some changes, the following formulae can be generated:

$$L = \left[\sum_{j=1}^J (1-h_j) * C_{j,t+\tau} \right] / (1+m_{O/N}) - \sum_{i=1}^I [(1+m_i-k)/(1+m_{O/N})] * L_{i,t+\tau} \quad (4)^3.$$

The first part of the above formulae is called the *discounted collateral value* of the pledged securities portfolio, and the constant part in bold in the second brackets is called the *multiplication factor*.

End-of-day re-valuation

After the account transactions performed in the MNB's customer account management system, customers are notified regarding the actual intraday credit line and usable funds by 18:00 CET (**I. ICS Usable Funds Advice**). The MNB calculates the figures of I. ICS Usable Funds Advice based on the re-valued collateralised credit with the central bank (the system accrues interest). As between 18:00 and 18:30 CET customers may change their intraday credit line limit for the subsequent day and the system can re-value central bank credits 'earlier', the MNB has decided to integrate this additional information into the processes as early as possible, making the management of intraday credit line easier for its customers.

By 19:00 CET, the pledged securities portfolio is also re-valued. By 19:00 CET, customers receive another advice (**II. ICS Usable Funds Advice**), in which the figures are calculated based on the new updated price of securities. If the customer receives a minimum balance requirement in the advice, additional collateral must be pledged, which is also indicated separately by the MNB.

The structure of ICS Usable Funds Advice is changed based on the daily and pooled collateral valuation. It is the MNB's intention to provide all information in these advices based on which customers can verify the figures of their own records, and can calculate their valid intraday credit line and ICS usable funds themselves. The customer advice lists contain the **following information**:

- intraday credit line,
- closing balance of the current account,
- ICS usable funds,

³ If the client has no covered loans, the limit is identical with the collateral value of pledged securities.

$$L = \left[\sum_{j=1}^J (1-h_j) * C_{j,t+\tau} \right] / 1,01.$$

If the client has only O/N covered loans, the limit shall be calculated as follows:

$$L = \left[\sum_{j=1}^J (1-h_j) * C_{j,t+\tau} \right] / 1,01 - L_{O/N} / 1,01.$$

If the client has O/N and two-week (2W) covered loans, the limit shall be calculated as follows:

$$L = \left[\sum_{j=1}^J (1-h_j) * C_{j,t+\tau} \right] / 1,01 - L_{O/N} / 1,01 - L_{2W}.$$

- O/N collateralised credit and related multiplication factor,
- more than one-day collateralised credit, and the related multiplication factor,
- matured forced overdraft and collection order.

Definitions

Intervention threshold (trigger): a pre-defined liquidity level, at which additional collateral may be requested or collateral may be refunded. Cf. daily collateral valuation. It is expressed in percentage, reflecting the percentage of O/N and longer-term liquidity provided by the MNB.

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.

Discounted collateral value: The collateral value divided by $(1 + \text{O/N initial margin})$.

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.

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 $100\% - \text{acceptance ratio}$.

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

ICS usable funds: the total of the intraday credit line and current account balance.

Initial margin: a risk management tool, expressed as a percentage of desired liquidity which requires that the acceptance value (amounts) of the offered securities should not only cover the required liquidity, but also its amount increased by the initial margin. The MNB may apply various initial margins according to the maturity of the credit transactions.

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.

Intraday credit line: part of the securities portfolio blocked by KELER Rt. and pledged for the MNB, which has not yet been used by the customer to cover O/N and longer than O/N collateralised credits. As the MNB applies pooled collateral valuation, there is only one amount, to which no specific securities can be allocated from the pool.

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

Minimum amount: the theoretically desired intraday credit line and ICS usable funds . At least this level must be reached with the additional collateral request, or, whenever securities are unblocked, the MNB only authorises unblocking of securities to an extent that the intraday credit line or ICS usable funds should not fall below this level.

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).

Minimum balance: a technical condition of the system (MNB customer account management system or VIBER) which requires a credit balance on the customer's current account that is identical with the minimum balance requirement.

Multiplication factor: a constant corresponding to the maturity of the central bank's collateralised credits. Equals: $(1 + \text{initial margin of a loan with a particular maturity} - \text{intervention threshold percentage})$ divided by $(1 + \text{O/N initial margin})$.