LCH The Markets' Partner	N°	Title
Instruction	IV.2-5	**MARGINING OF TRANSACTIONS ON DEBT SECURITIES EXECUTED ON TRADING AND MATCHING PLATFORMS AND ON THE MTS ITALY MARKET (CALCULATION METHODOLOGY)**

CHAPITRE 1   SCOPE

Article 1

For the purpose of this Instruction, the term "Variation Margin" covers the notion of negotiation risk.

This Instruction sets out the procedure for the calculation of Margins on Transactions on Debt Securities executed on Trading and Matching Platforms and on MTS Italy.

In the framework of this Instruction, as far as Repos are concerned, the following definitions apply:

- The buyer of Securities holds the obligation to deliver cash payment on the settlement of the Initial Transaction and the obligation to deliver Securities back on the intended Settlement Date of the Return Transaction.

- The seller of Securities holds the obligation to deliver Securities on the intended Settlement Date of the Initial Transaction and the obligation to deliver cash back on the settlement of the Return Transaction.

The margining methodology foresees the following types of Margins:

a)   Variation Margin, which covers the negotiation risk and is based on a daily or twice daily re-evaluation of the portfolio to the market;

b)   Initial Margin, which evaluates the potential loss under the hypothesis of portfolio liquidation. The risk parameters for the Initial Margin calculation are set out in a risk Notice. The Initial Margin is updated twice a day.

c)   Forward Repo margins, which are specifically calculated and which evaluate the potential loss under the hypothesis of liquidation of this Forward Repo. Forward Repo margins are based on the application of calibrated parameters as set out in a Notice. The Forward Repo margin is updated during the intraday margin call.

d)   Specific Initial Margin on Net Fails which is computed separately for the purposes of the start of day calculation of Margin and then added to the final result;

e)   Specific Variation Margin on Net Fails which is computed as part of the calculation of Margin for each margin run.

The provisions of this Instruction do not apply to Special Clearing Members, save for articles 2 and 5 b).

CHAPITRE 2   MARGINING METHODOLOGY

Section 2.1   Calculation of Variation Margins

Article 2   Common Provisions

The calculation is based on the following steps:

Retrieval of market prices

In order to re-evaluate the portfolio, Trade Legs are re-evaluated on the basis of their current market value at Settlement Prices; such prices are representative of market conditions at the time of calculation.

Selection of Trade Legs to be included in calculation of Variation Margins

The following Trade Legs will be included in calculation of Variation Margins:

a)   For sell and purchase Transactions, all unsettled Trade Legs at the Margin calculation date;

b)   For Repos, all Trade Legs resulting from the Initial Transaction which has already been settled and resulting from its Return Transaction which is still unsettled at the Variation Margin calculation date.

For the avoidance of doubt, Forward Repos are not included in the calculation of Variation Margins. A specific Forward Repo Margin is calculated as defined hereafter in article 4.

For the avoidance of doubt, Net Fails are not included in the calculation of Variation Margins. A specific Variation Margin is calculated for Net Fails as defined hereafter in article 5.

Calculation of Variation Margin per Trade Leg

The different steps of the calculation (accrued coupon; Repo Interest; Trade Leg Revaluated Amount) are described in a Notice.

The Variation Margin is equal to the discounted difference between the Trade Leg Revaluated Amount (TRA) and the traded amount;

- For Repo Trade Leg, the Repo Interest (RI) amount must also be considered.

- For buy and sell back Transaction, coupon payment until the maturity of the Transaction must also be considered.

Therefore:

a)   Sell and purchase Trade Leg:
$$Variation\ Margin = (TRA - Traded\ Amount) \times Discount\ Factor \ \times position\ sign^{1};$$

b)   Repos Trade Leg:
$$Variation\ Margin = (TRA - Traded\ Amount - RI) \times Discount\ Factor \ \times position\ sign^{2}$$

Calculation of the overall Variation Margin

The Overall Variation Margin is equal to the sum of all the Variation Margins calculated for each Trade Leg.
$$Overall\ Variation\ Margin = \sum Variation\ Margins\ per\ each\ Trade\ Leg$$

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[1] For sell and purchase Transactions, the buyer of securities has a long position (+1) and the seller of securities has a short position (-1).

[2] For Repos, the buyer of Securities has a short position (-1) and the seller of Securities has a long position (+1).

Regarding Clearing Members other than Special Clearing Members, a negative Variation Margin results in a debit for the Clearing Member towards LCH SA; a positive Variation Margin results in a theoretical credit for the Clearing Member.

Regarding Special Clearing Members only, the Variation Margin call at "t" is:

$$Variation\ Margin\ Call_t = Overall\ Variation\ Margin_t - Overall\ Variation\ Margin_{t-1}$$

Therefore, regarding Special Clearing Members only, a negative Variation Margin call results in a debit for the Special Clearing Member towards LCH SA; a positive Variation Margin results in a credit for the Special Clearing Member.

Section 2.2   Calculation of Initial Margins

Article 3   Common Provisions

The methodology is based on the following steps:

Article 3.1.   Selection, evaluation of Trade Legs and classification of Open Positions to be included in Initial Margins calculation:

Selection of Trade Legs

The following Trade Legs are evaluated (as in the case of the calculation of Variation Margin), with the exception of the Net Fails calculated for the purposes of the initial daily Margin calculation for which the calculation is defined hereafter in article 5 of this Instruction:

a)   For sell and purchase Transactions, all unsettled Trade Legs at the margin calculation date;

b)   For Repos, all Trade Legs resulting from the Initial Transaction which has already been settled and resulting from its Return Transaction which is still unsettled at the Initial Margin calculation date.

For the avoidance of doubt, Forward Repos are not included in the calculation of Initial Margins. A specific Forward Repo Margin is calculated as defined hereafter in article 4.

For the avoidance of doubt, Net fails are computed daily and are integrated in the intraday calculation of Initial Margin, but are computed separately for the purposes of the start of day calculation of Initial Margin and subsequently added in the final result, as set-out in article 5 below.

Trade Legs evaluation

The Trade Legs evaluation is made on the basis of Settlement Price.

In order to obtain a single net balance for each security by ISIN code long and short Trade Legs are algebraically summed (at their re-evaluated countervalue), independently of the Transaction type (sell and purchase Transactions or Temporarily Transfer of Securities Transactions) from which they have arisen. Therefore, an Open Position is obtained for the buyer (buying position) or the seller (selling position).

Classification of portfolio securities

Open Positions calculated at the above step are then divided in Duration Classes, according to their

sensitivity to interest rates fluctuations. Duration is used as an indicator of such sensitivity.

Since duration changes every day it is necessary to reallocate daily securities in classes. A Notice defines criteria applied to duration classes.

Article 3.2. Determination of marginable Open Positions

In order to take into consideration the opposite sensitivity to interest rate variations of Open Positions of different signs, Open Positions are reduced by a procedure that – keeping into consideration correlations between Securities sorted by Duration Classes – determines the "marginable Open Positions" that is the unbalanced positions on which Margins must be calculated.

In order to achieve such aim, a sequence of offsetting priorities is determined according to a specific list; Positions are offset within the same Duration Class (Intra Class Priority) and subsequently among different contiguous duration classes (Inter Class Priority). A cross-position offsetting factor is associated to each Priority.

Therefore, according to the established priority sequence, long and short positions within the same class are decremented by an amount equal to the cross-position offsetting factor applied to the smaller of the two Open Positions.

> Decremented Long Position Class n = Long Position Class n – [priority n Cross-Position Offsetting Factor × min (Long Position Class n; Short Position Class n)]

> Decremented Short Position Class n = Short Position Class n – [priority n Cross-Position Offsetting Factor × min (Long Position Class n; Short Position Class n)]

When inter class priorities are considered, both the long and the short position of one class will be decremented of an amount equal to pertinent Inter class cross-position offsetting factor applied to he smaller between the position itself and the Open Position of opposite sign of the other Class.

> Decremented Long Position Class n = Long Position Class n – [priority nm Cross-Position Offsetting Factor × min (Long Position Class n; Short Position Class m)]

> Decremented Short Position Class n = Short Position Class n – [priority nm Cross-Position Offsetting Factor × min (Long Position Class m; Short Position Class n)]

> Decremented Long Position Class m = Long Position Class m – [priority nm Cross-Position Offsetting Factor × min (Long Position Class m; Short Position Class n)]

> Decremented Short Position Class m = Short Position Class m – [priority nm Cross-Position Offsetting Factor × min (Long Position Class n; Short Position Class m)]

For each class the results obtained by the application of priority n cross-position offsetting factor is the starting point for the application of priority n+1 cross-position offsetting factor.

Counter values are rounded to the nearest integer euro before and after each calculation.

Article.3.3 Calculation of Initial Margin

For each Class, long and short "Marginable Positions" – which have been obtained through the above described procedure – are compared and the largest (in absolute value) among them is multiplied by a coefficient (Deposit Factor) specifically established for that duration class.

$$IM\ per\ class = Class\ deposit\ factor\ \times Max(Long\ marginable\ position; Short\ marginable\ position)$$

The result is rounded to the nearest integer euro.

Initial Margins for each duration class are then summed up in order to obtain the total Initial Margins:

$$Total\ IMs = \sum IM\ per\ duration\ class$$

All Initial Margins are always indicated with a positive sign.

Section 2.3   Calculation of specific Forward Repo Margin

Article 4

LCH SA calculates a specific Forward Repo Margin according to a dedicated methodology described in a Notice.

This specific Margin amount is calculated as part of the calculation session dedicated to Debt Securities Intra-day Margins:

- If the Clearing Member is called as part of the Debt Securities Intra-day session, the specific Forward Repo Margin is included in this Debt Securities Intraday Margins call session.

- If the Clearing Member is not called as part of the Debt Securities Intraday session, the specific Forward Repo Margin is included in the Initial Margin call of the following Clearing Day.

Section 2.4   Calculation of Net Fails Margins

Article 5

a) *Initial Margin on Net Fails*

The separate computation of Initial Margin on Net fails occurs only during the start of day Margin calculation. Net fails are calculated independently from Margins calculation on Trade Legs resulting from sell and purchase Transactions and on Trade Legs resulting from Repos.

For each Net Fail, LCH SA calculates Initial Margin with the same methodology applied on all Transactions on Debt Securities, with the exception that Trade Legs on Net Fails are not netted.

As a consequence of the late delivery, the amount of Initial Margin on Net Fails during the start of day Margin calculation is marked up by 10% per Clearing Day.

$$\begin{aligned} Initial\ &Margin\ Net\ Fails \\ &= Remaining\ Reevaluated\ Amount\ \times duration\ class\ parameter\ \times (1 \\ &\quad + 10\%\ \times number\ of\ Clearing\ Days\ for\ late\ delivery) \end{aligned}$$

b) *Variation Margin on Net Fails:*

The calculation of Variation Margin on Net fails is made in the same way during the start of day Margin calculation and the intraday Margin calculation.

$$Variation\ Margin\ Net\ Fails$$
$$= (Remaining\ Reevaluated\ amount - Remaining\ Initial\ Trade\ legs\ amount) \times pos\ sign$$

In addition, for Special Clearing Members only, the Variation Margin on Net Fails call at 't' is:

$$Variation\ Margin\ Call\ on\ Net\ Fails_t = Variation\ Margin\ Net\ Fails_t - Variation\ Margin\ Net\ Fails_{t-1}$$

Section 2.5   Calculation of Total Margins

Article 6

Total Margins are equal to the sum of Variation Margins, Initial Margins and Intra-day Margin. Should the amount of Variation Margins credit be larger than the amount of Initial Margin and Intra-day margin debits, the difference is not paid out to the member, being just a theoretical credit.

$$TotalMargin_t = Max(Initial\ Margin_t + intraday\ additional\ Margin_t + Initial\ Margin\ on\ Net\ Fails_t$$
$$- Variation\ Margin_t - Variation\ Margin\ on\ Net\ Fails_t; 0)$$

Total Margins are requested from Clearing Members. Collateral is re-evaluated on the basis of the previous Margins calculation session results and both following Margins call processes are applied:

a)   If total Margins are larger than the total Margins collected the previous day, members are compelled to deposit the difference;

b)   If total Margins are smaller than the total Margins collected the previous day, the excess may be withdrawn by the member.

Section 2.6   Determination of Margins parameters

Article 7

The parameters (deposits factors, priority and cross position credit) are defined in a Notice.

The parameters used by the Margins calculation procedure will be periodically revised and, if the case may be, updated in order to keep into account market conditions, volatility trends and the evolution of Financial Instruments.

It will be then possible to modify:

⇒   Cross-position offsetting factor;

⇒   Deposit factor;

⇒   Duration class "Borders";

⇒   Priority list.

⇒   Specific parameters for Forward Repos

Besides, an adjustment factor at member level may be set up by LCH SA under its sole discretion (for example: pursuant to article 4.2.0.3. of the Clearing Rule Book, LCH SA shall at all times and at any time

during the day have the right to impose upon a Clearing Member other than a Special Clearing Member additional margins as it reasonably deems useful or necessary).

Section 2.7   Calculation of Debt Securities Intra-Day Margins

Article 8   General provision

In addition to the Variation Margins and Initial Margin calculated and called pursuant to Article 4.2.0.1 of the Clearing Rule Book and related Instructions, and pursuant to Article 4.2.0.2 of the Clearing Rule Book, LCH SA calculates Debt Securities Intra-day Margins.

Intra-day Margins calculation is performed once per Clearing Day in the course of one Intra-day Margin calculation session dedicated to Debt Securities.

Clearing Members Open Positions from the previous Clearing Day are re-evaluated using prices representative of the market conditions at the time of the Intra-day Margin calculation.

Based upon those re-evaluated Open Positions, Clearing Members Margins are re-evaluated.

This calculation process may result in a Debt Securities Intra-day Margin call in the conditions described in this Instruction and related Notices.

Debt Securities Intra-day Margins are calculated according to the same methodology used for daily Initial Margins.

The following Trade Legs are included in the calculation of Debt Securities Intra-day Margins calculation session cut-off time:

a) For sell and purchase Transactions, all unsettled Trade Legs

b) For Repos, all Trade Legs whose Initial Transaction has already been settled and its Return Transaction is still unsettled

c) Net fails resulting from sell and purchase Transactions and Repos defined above

d) For Same-Day-Repos, all Trade Legs which Return Leg is still unsettled.

Article 9   Variation Margin amount used as part of the Debt Securities Intraday Margin calculation

The amount of Variation Margin is re-evaluated as part of the Debt Securities Intra-day Margin calculation. For Special Clearing Members, LCH SA does not re-evaluate Variation Margin intra-day.

Article 10   Definition of Debt Securities Intra-day Margin requirements

Debt Securities Intra-day Margins Requirements notably include:
a) Initial Margins re-evaluated on the basis of re-evaluated Open Positions as defined in article 8 of this Instruction
b) Variations Margins as defined in article 10 of this Instruction
c) Specific Forward Repo Margin as defined in article 4 of this Instruction

Article 11   Revaluation of Collateral

All assets posted as Collateral pursuant to Instruction IV.4-1 are re-evaluated on the basis of real-time prices.

Article 12   Debt Securities Intra-day Margin calls conditions

The timing of the Debt Securities Intra-day calculation session is defined in a Notice.

However, in the course of the Clearing Day as described in the related Notice, LCH SA can as it deems necessary modify the timing of the Debt Securities Intra-day calculation session

For each Clearing Member, LCH SA compares the amount of Intra-day Margin requirement to the amount of the latest cover call. The cover call is defined as the total amount of assets deposited as Collateral by the Clearing Member.

LCH SA shall then perform the following process:

- For each Clearing Member for which:

$$\begin{array}{c} \text{Latest cover call} \\ + \\ \text{Threshold amount} \\ \text{(defined in Article 13} \\ \text{below)} \end{array} \quad < \quad \begin{array}{c} \text{Intra-day Margins requirements} \\ \text{(as described in a Notice)} \end{array}$$

LCH SA reevaluates the amount of existing Collateral and compares such amount to the amount of Debt Securities Intra-day Margin requirement.

And then,

- For each Clearing Member for which as a result of such comparison it appears that:

existing revalued Collateral   <   Debt Securities Intra-day Margin requirement

LCH SA actually performs a Debt Securities Intra-day Margin call.

Article 13   Thresholds calculation methodology

The thresholds' parameters are defined and assessed by LCH SA with a regular frequency as any other parameters.

The threshold's parameters are set out in the Notice dedicated to Margins parameters.