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e u r e x c l e a r i n g *circular 048/10*

Date: Frankfurt, July 13, 2010
Recipients: All Clearing Members of Eurex Clearing AG and Vendors
Authorized by: Thomas Book

⚠ **Action required** ⚠ **High priority**

Enhancement of the Risk-Based Margining Method: New Theoretical Price Files and new Report

Related Eurex Circulars: 019/10

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Content may be most important for:

Ü Middle + Backoffice
Ü IT/System Administration
Ü Auditing/Security Coordination

Attachment:

New Additional Theoretical Price Files for RBM with changes in implied volatility

Summary:

With Eurex Clearing circular 019/10 “Changes in Implied Volatility for Risk-Based Margining”, Eurex Clearing announced on March 31, 2010 that the Risk-Based Margining methods of Eurex Clearing have been enhanced by implementing changes in the implied volatility.

To provide more transparency in the methodology and to support members in reconciliation of calculation in their back office system, Eurex Clearing will offer more information regarding the implied volatility shifts, namely three additional Theoretical Price Files and a new report which reflect volatility adjustments. The distribution to the member MISSes will take place after the distribution of the already existing price files FPTHED, FPTHEF and FPTHEU.

Distribution of the Theoretical Price Files and of the new report will start with the end-of-day processing on **July 19, 2010**.

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Enhancement of the Risk-Based Margining Method: New Theoretical Price Files and new Report

With Eurex Clearing circular 019/10 “Changes in Implied Volatility for Risk-Based Margining”, Eurex Clearing announced on March 31, 2010 that the Risk-Based Margining methods of Eurex Clearing have been enhanced by implementing changes in the implied volatility.

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Distribution of the Theoretical Price Files and of the new report will start with the end-of-day processing on July 19, 2010.

Additional Theoretical Price Files

The new files will only contain series with open interest. The values within the files are different in order to cover the vega risk, but the structure itself is unchanged.

No intra-day versions of these files are available.

The naming convention of these files is as follows:

Theoretical Price file for	**Current file name**	**Equivalent file name for the Volatility adjusted versions**
Derivatives	FPTHED	FPTHVD
Flex Contracts	FPTHEF	FPTHVF
ISE-link Contracts	FPTHEU	FPTHVU

The attached document explains the structural changes in relation to the existing files and how to use the information.

Eurex Clearing will publish file descriptions and sample files for download on the Eurex website under the path:

www.eurexchange.com > Market Data > Automatic File Services > Available Files

The existing files FPTHED, FPTHEF and FPTHEU will remain unchanged and continue to be distributed as before.

The vola-adjusted files will also be available via the “File Service” on the Eurex website.

The interim files will be created as long as the current files will be changed with Eurex Release 13.1 (introduction planned for April 11, 2011).

Report RPTCV050 in XML-format

Report RPTCV050 “Margin Calculation (Vola)” will be provided in XML-format (same layout as report RPTCC050 “Daily Margin”) to Trading and Clearing Members after having been selected in the Eurex Clearing-GUI (**Report Selection** window). Subscription to this report can be made as of July 19, 2010. Also Clearing Members who already receive the report in a different format will have to subscribe anew, otherwise distribution of this report will be cancelled.

For further functional assistance please contact Market Supervision Risk Operations at tel. +49-69-211-1 24 52 (09:00-18:00 CET). For technical assistance please contact Eurex Technical Support at tel. +49-69-211-1 12 00.

Frankfurt, July 13, 2010

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E u r e x C l e a r i n g

Eurex Clearing AG

New Additional Theoretical Price Files for RBM with changes in implied volatility

Management Summary

This document describes the new Theoretical Price Files (TPFs) FPTHVD, FPTHVF, and FPTHVU used within the Risk Based Margining that includes changes in the implied volatility (RBMIV). The new TPFs contain only series with open interest and are a changed version of the current TPFs FPTHED, FPTHEF and FPTHEU. The current TPFs will not be changed and distributed as today.

The naming convention of the new TPFs is as follows:

Theoretical Price file for	Current file name	Equivalent file name for the Volatility adjusted versions
Derivatives	FPTHED	FPTHVD
Flex Contracts	FPTHEF	FPTHVF
ISE-link Contracts	FPTHEU	FPTHVU

Keywords
Risk Management, Risk Model, Margin Model, Model Validation

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1. Introduction

1.1. Overview

First the concept of the Risk Based Margining that includes changes in the implied volatility (RBMIV) is outlined in the following. Then, the changes of the new Theoretical Price Files (TPFs) to the existing TPFs are described in terms of differences. The new TPFs will be sent out in addition to the existing TPFs that are specified in [1].

In section 2 the definitions and abbreviations used throughout the document are explained.

Section 3 provides the functional outline of the calculation steps in the RBMIV.

The changes in the physical interfaces for RBMIV are detailed in section 4.

1.2. Associated Documents

[1] Eurex Release 12.0: Member Interface Specification - File Interface Layouts

2. Functional Outline

2.1. Overview - Summary

The additional margin in the Risk Based Margining (RBM) methodology serves to cover liquidation costs that potentially could be incurred over the liquidation period. The underlying undergoes an adverse shift by the margin parameter to calculate this additional margin requirement. Additionally, option prices changes are driven not only by changes in the underlying but also changes in the implied volatility. Including these changes in implied volatility in the RBM for portfolios with options essentially involves simultaneously varying both underlying price and implied volatility on Margin Class level for all members.

RBM used up to 29 buckets expressing different underlying prices within a margin interval around the current underlying price but all buckets used the same volatility parameter. For each bucket one theoretical price was calculated. In the new RBMIV calculation that includes changes in the implied volatility, for each bucket two theoretical prices will be calculated based on a volatility up shift scenario and a volatility down shift scenario. For non-option products (e.g. futures, bonds, equities, subscription rights), still only one theoretical price will be calculated per bucket (no vola shift scenarios). Also, for expired option series only one theoretical price will be calculated (intrinsic value, no vola shift scenarios).

The same applies to liquidating values – RBM calculated one liquidating value per bucket for each position using the theoretical price. In contrast, in RBMIV two liquidating values for each option position will be calculated per bucket based on the two theoretical prices mentioned above. For non-option positions or expired option positions still only one liquidating value will be calculated per bucket (no vola shift scenarios for non-options and expired options).

The existing intra-day and end-of-day processing remain unchanged, i.e. all Members receive their reports (e.g. CC050, CC055, CC060, CD042) without the inclusion of the enhancement.

Overnight Eurex Clearing will calculate the changed margin amount including the volatility shift scenarios. By this means the potential additional exposure due to the Vega risk is determined. The calculation results will be made available to the Members, i.e. all Clearing Members receive margin reports (CV050, CV055, CV060, CV042), that are structured exactly the same as the regular EOD reports (CC050, CC055, CC060, CD042), but contain the margin figures as determined by Risk-Based Margining including the changes in the implied volatility.

Until 10:00 CET on the next business day, Eurex Clearing will aggregate the potential additional exposure of the Clearing Member's accounts and all NCMs to one sum and charge this total sum to a new margin class called "VEGA1" on the Clearing Member's P-account. Thereby, the exposure of the margin class "VEGA1" is adjusted only once a day. From the time the margin class "VEGA1" is updated, updated numbers are reflected in the following intra-day and end-of day calculations.

The detailed reports CV050, CV055, CV060, CV042 enable Members to break down the additional exposure to the respective Member, account and margin class.

2.2. Detailed Description

For each Margin Class $j \in \{\text{DAX}, \text{EUSX}, \text{ALV}, \text{FGBL}, ...\}$ the position values are calculated at all regular strikes UL_i^j, $i = \{-k, -k+1, \mathbf{K}, -1, 0, +1, \mathbf{K}, +k-1, +k\}$ within as well as at the upper and lower bound of the margin parameter confidence interval $[-MP, +MP]$. Here $-k$ and k are the indices of the smallest and largest strike greater and smaller, respectively, than the Margin Parameter interval bounds and can be different with respect to Margin Class, contract and maturity. For each valuation point, two implied volatility values are used $vola_{l,down}^j$, and $vola_{l,up}^j$. Regardless of the strike pattern of Margin Class j the changes of the implied volatility are given for a set of n_j subintervals of the Margin Parameter for the specific Margin Class j. Thus, for a given option series s in Margin Class j, the implied volatility values $vola_{l,down}^s$, and $vola_{l,up}^s$ are the values of $vola_0^s$ shifted up and down by a relative amount where $l = 1, \mathbf{K}, n_j$ is the number of the subinterval of the Margin Parameter for Margin Class j.

Thus, the following graph shows the principle of the calculations with the RBMIV in which the volatility is both shifted up and down to determine the adverse case.

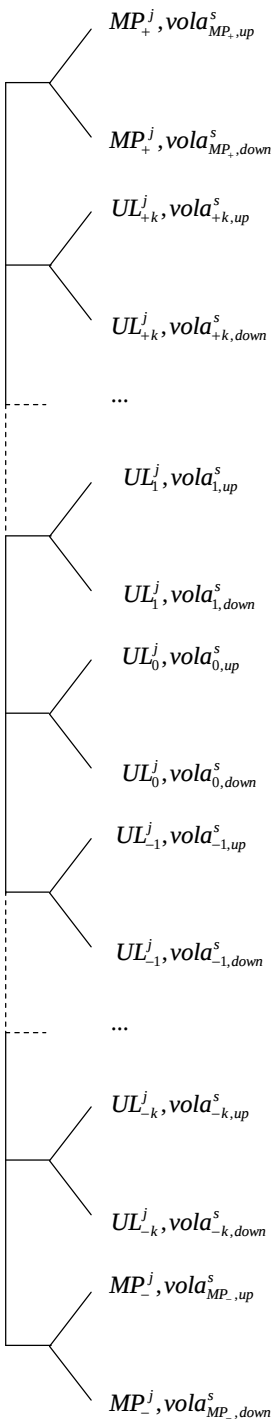


Figure 1: New RBMIV that includes changes in the implied volatility

2.3. Margin Groups

RBMIV aggregates the liquidating values on position level into two liquidating value on Member/Account/Margin class level by considering the Worst Case Liquidating Values (WCLV) over all volatility scenarios for the underlying price moves up ($WCLV_{UL_up}$) and down ($WCLV_{UL_down}$) as well as when the underlying price does not move ($WCLV_{UL_constant}$). As shown in Figure 2, first these three Worst Case Liquidating Values are determined according to whether the underlying price moves up, down or does not move.

In the next step, the liquidating value $WCLV_{UL_constant}$ when the underlying price does not move will be compared to $WCLV_{UL_up}$ when the underlying price moves up and to $WCLV_{UL_down}$ when the underlying price moves down in the following way:
(1) if the liquidating value $WCLV_{UL_constant}$ results in a margin credit to the member[3], $WCLV_{UL_constant}$ will not be considered in margin results
(2) else, if the liquidating value $WCLV_{UL_constant}$ results in a margin debit or a zero margin, but either $WCLV_{UL_up}$ or $WCLV_{UL_down}$ is worse than (greater) or equal to the liquidating value $WCLV_{UL_constant}$, $WCLV_{UL_constant}$ will not be considered in margin results either
(3) else
(a) if $WCLV_{UL_up}$ is worse than $WCLV_{UL_down}$, the $WCLV_{UL_constant}$ will replace $WCLV_{UL_up}$ in the following calculations (margin grouping, etc.)
(b) if $WCLV_{UL_down}$ is worse than $WCLV_{UL_up}$, the $WCLV_{UL_constant}$ will replace $WCLV_{UL_down}$ in the following calculations (margin grouping, etc.)
(b) if $WCLV_{UL_down}$ is equal to $WCLV_{UL_up}$, the $WCLV_{UL_constant}$ will replace $WCLV_{UL_up}$ as well as $WCLV_{UL_down}$ in the following calculations (margin grouping, etc.)

[3] i.e. the liquidating value $WCLV_{UL_constant}$ is lower than the current liquidating value CLV.

The following table shows some examples

	Before comparison			After comparison	
CLV	$WCLV_{UL_constant}$	$WCLV_{UL_up}$	$WCLV_{UL_down}$	$WCLV_{UL_up}$	$WCLV_{UL_down}$
100	90	60	60	60	60
100	100	110	70	110	70
100	110	80	70	110	70
100	110	70	80	70	110
100	110	80	80	110	110

As a result, analogously to regular RBM, one liquidating value for the underlying direction up and one liquidating value for the underlying direction down is generated for further processing on Margin Group, account and member level.

Thus, for cross-margining in a margin group the worst case liquidating value in one Margin Class of all volatility scenarios with a given underlying price direction is compared with the worst case liquidating value in the other Margin Class of all volatility scenarios with the same given underlying price direction.

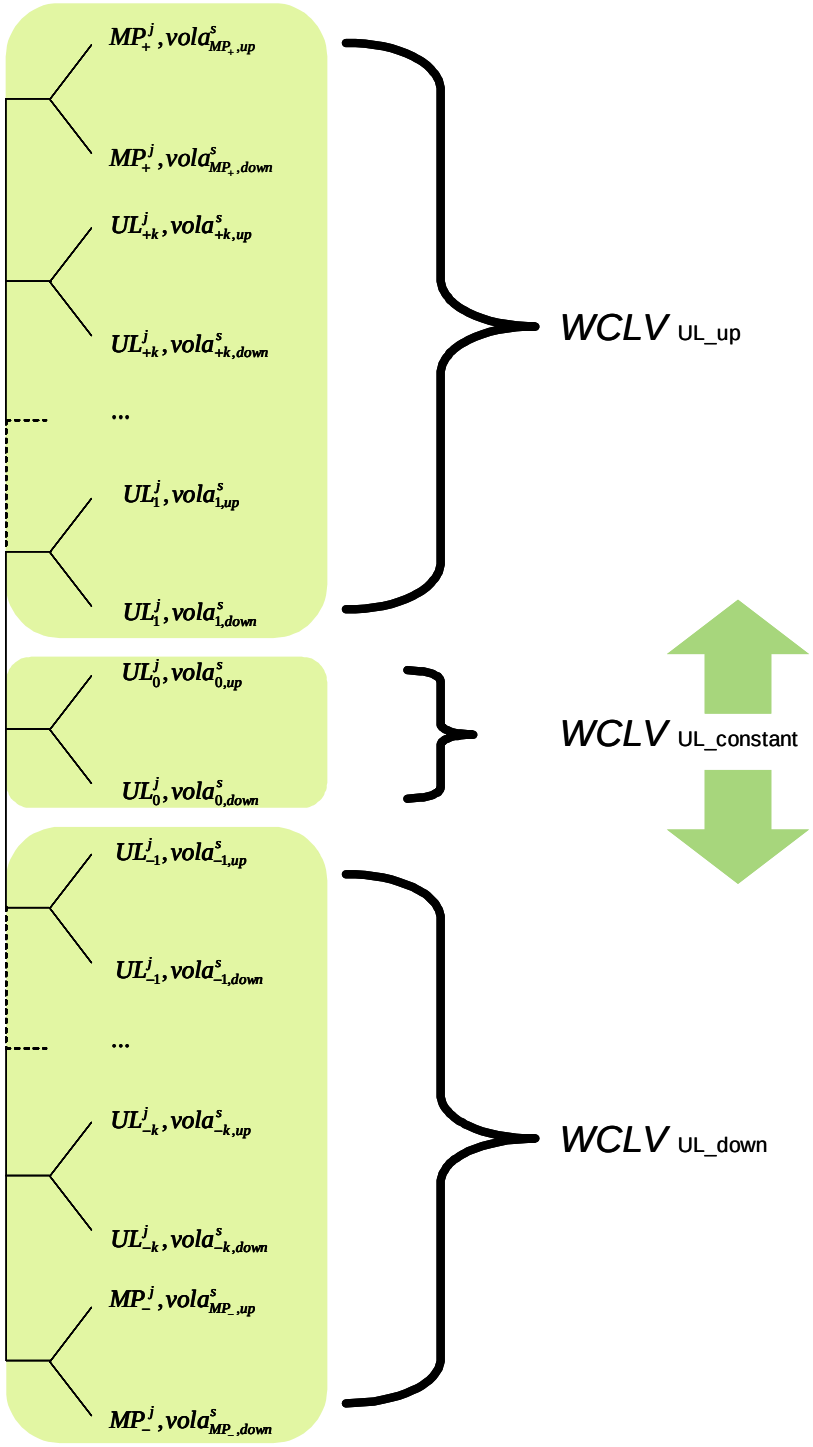


Figure 2: Margin Groups

3. Changes in Physical Interfaces

The fields in the new TPFs FPTHVD, FPTHVF, FPTHVU that change their contents compared to the unchanged TPFs FPTHED, FPTHEF and FPTHEU[4] are given in the table below. The old description refers to RBM and the new description refers to RBMIV that includes changes in the implied volatility. The description and contents of all other fields are unchanged.

Only the fields are named where the content of the fields in the new files differs from those in the existing files. The structure of the new files is the same as for the old files but the values are different.

Field	UD-IND-RMTHVD
Old Description in RBM	This field contains an indicator that shows whether the projected underlying price is less than (downside) or greater than (upside) the closing price of the underlying. "D" – downside "U" – upside
New Description in RBMIV	This field contains an indicator that shows both whether the projected underlying price is less than (downside), greater than (upside) the closing price of the underlying or at the closing price of the underlying and whether the synthetic volatility used for theoretical price calculations (implied volatility) is shifted according to the up or down scenario or is not shifted. "D" – downside of projected underlying price and implied volatility not shifted "E" – downside of projected underlying price and up scenario of implied volatility "F" – downside of projected underlying price and down scenario of implied volatility "N" – closing price of the underlying and implied volatility not shifted "O" – closing price of the underlying and up scenario of implied volatility "P" – closing price of the underlying and down scenario of implied volatility "U" – upside of projected underlying price and implied volatility not shifted "V" – upside of projected underlying price and up scenario of implied volatility "W" – upside of projected underlying price and down scenario of implied volatility

[4] Please note that the FPTHEU is currently empty and not available in the file service on the internet page.

Field	STOCK-PRC-IND-RMTHVD
Old Description in RBM	This field contains an indicator showing whether the theoretical price calculated relates to a minimum projected underlying price (2), to an in-between strike (3) or to a maximum projected underlying price (1).
New Description in RBMIV	This field contains an indicator showing whether the theoretical price calculated relates to a minimum projected underlying price (2), to an in-between strike (3), to a maximum projected underlying price (1) or the current closing price of the underlying (0).

Field	VOL-RMTHVD
Old Description in RBM	This field contains the synthetic volatility used for theoretical price calculations (implied volatility). The implied volatility is constant for one option series.
New Description in RBMIV	This field contains the synthetic volatility used for theoretical price calculations (implied volatility). The implied volatility can vary for one option series depending on the projected underlying price and depending on implied volatility scenario (up/down).