EURONEXT CLEARING

FIXED INCOME RISK ENGINE

Decorrelation risk add-on

Methodological notes

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1 Introduction

This document describes the procedures to be put in place in order to compute the *decorrelation risk* add-on. In particular, the *decorrelation risk* add-on aims at measuring the impact over Margins that a break in correlation between tenors of the same country curve would have.

The logic applied for the computation of intra-country *decorrelation risk* is also valid for the computation of inter-country *decorrelation risk*. Given the negligible amount of trades currently placed over countries other than Italy, at the moment inter-country *decorrelation risk* is not considered in the Margin computation.

The methodology herein described is the same as the *Undiversified* approach reported in *Expected Shortfall* module.

The following sections define how to retrieve the *decorrelation risk* add-on amount and how to implement it in the computation of the total Margin requirement for each Clearing Member.

The *decorrelation risk* add-on must be computed for each margining sub-portfolio, i.e. it must be applied to all sub-portfolios consisting of bonds issued by the following countries:

- Italy;
- Spain;
- Ireland;
- Portugal,
- France,
- Germany,
- Netherlands,
- Belgium,
- Finland,
- Austria,
- Supranational bonds

The *decorrelation risk* add-on is not computed on securities comprised within duration classes XXXI-XXXV, for which the MVP margining methodology will still be applied.

2 *Decorrelation risk* amount computation

The following steps must be applied to all sub-portfolios.

Consider the following portfolio of long *zero-coupon* bonds (two nominal bonds and one – hypothetical – real bond):

Table 1: Margining portfolio

N°	ISIN	Issuer	Maturity	Amount
1	IT000X	IT	1Y	100
2	IT000Y	IT	2Y	100
3	IT000Z	IT (*linker*)	1Y	100

Suppose now that the cash-flow mapping procedure produced the following results (nominal and real bonds are mapped onto different curves – see *Mapping* modules):

Table 2: Margining portfolio – Cash-flow mapping

Curve	Tenor	Amount
IT	1Y	100
IT	2Y	100
IT_REA	1Y	100

For each tenor in the above table the set of *unscaled* / *scaled* scenarios must be produced as per normal margining process (these are the same scenarios applied as per standard procedure):

Table 3: Margining portfolio – Scenarios

Curve	Tenor	Unscaled scenarios	Scaled scenarios
IT	1Y	*n scenarios (n: lp)*	*n scenarios (n: lp)*
IT	2Y	*n scenarios (n: lp)*	*n scenarios (n: lp)*
IT_REA	1Y	*n scenarios (n: lp)*	*n scenarios (n: lp)*

Each tenor must now be treated as a separate entity, despite the curve which it belongs to. In particular, for each tenor both an *unscaled* and a *scaled Expected Shortfall* (with and parameters equal to those applied to overall Margin computation process – e.g. *single* / *double tail*, etc.) must be defined as if each tenor were a singular margining portfolio:

Table 4: ES computation for each single tenor (separately)

Curve	Tenor	Unscaled ES	Scaled ES
IT	1Y	*unsc_1y_it*	*sc_1y_it*
IT	2Y	*unsc_2y_it*	*sc_2y_it*

IT_REA	1Y	*unsc_1y_it_rea*	*sc_1y_it_rea*

It is now possible to define, for the entire portfolio, the *unscaled* and *scaled decorrelation risk* amounts to be considered:

Table 5: Total *decorrelation risk* amounts (entire portfolio)

Portfolio Unscaled Decorrelation risk amount	**Portfolio Scaled Decorrelation risk amount**
unsc_1y_it + *unsc_2y_it* + *unsc_1y_it_rea*	*sc_1y_it* + *sc_2y_it* + *sc_1y_it_rea*

These *decorrelation risk* amounts (or *Undiversified* ES) will be used in order to compute the final add-on, as described in the following section.

3 *Decorrelation risk* add-on computation

Once the *decorrelation risk* amounts for the margining sub-portfolio have been defined, it is possible to compute the final add-on. At this point, both the *Diversified* ES of the portfolio (retrieved through the standard procedure) and the *Undiversified* ES of the portfolio (as per section above) are available, with the latter >= than the former. The following formulae are applied for the definition of the add-on (at sub-portfolio level):

(1) $\text{Unscaled\_decorrelation\_risk\_add-on} = 0.2 * (\text{UnscaledES}_{\text{undiversified}} - \text{UnscaledES}_{\text{diversified}})$;

(2) $\text{Scaled\_decorrelation\_risk\_add-on} = 0.2 * (\text{ScaledES}_{\text{undiversified}} - \text{ScaledES}_{\text{diversified}})$.

The results obtained with formulae (1) and (2) are then added to the respective *Unscaled* and *Scaled* (*diversified*) *Expected Shortfalls*.