

FIRE – Liquidity & Concentration Framework

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EURONEXT CLEARING

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The Expected Shortfall methodology implemented by Euronext Clearing in margining assets belonging to the Fixed Income Section relies on the adoption of benchmark curves. In particular, risk exposures are re-evaluated by means of historical scenarios built on the relevant risk factors of the Sovereign curve each specific security belongs to. The theoretical values obtained through the aforementioned procedure represent mid-market re-evaluations as retrieved by the bootstrapped Government curves:

Table 1 : Core ES margining approach

Margin Component	Risk Factor/s	Assessment	Margined principle
Mark-to-Market Margin	Market Price Risk (from trade date to evaluation date)	Assessed through ISIN specific market data evidence	Mid-price observed volatility (ISIN specific)
Expected Shortfall Margin - Unscaled ES - Scaled ES - Spectral Risk Measures	Market Price Risk (what-if scenarios) <i>Under/Overestimation of Market Price Risk (pro-cyclicality concerns vs adequate reactivity of the model)</i> <i>Tail Dilution Risk</i>	Assessed through re-evaluation by means of Benchmark curves	Mid-price what-if volatility (theoretical values based on benchmark curves)

The approach described in Table 1 has the advantage of allowing the CCP to factor-in past stressed market events even when re-evaluating those securities that have not directly experienced them (e.g., newly issued instruments). Nevertheless, benchmarking techniques require a solid assessment of whether the theoretical values used in the risk metric adopted are adequate to fully represent underlying risks in margined portfolios (i.e., whether benchmark curves are also capturing non-vanilla risk profiles). Additionally, while the results of the model are obtained at a mid-market level (both for the deterministic and the what-if components), close-out trades would in reality happen either at the bid or ask quoted prices (with increasing uncovered costs as the bid/ask spread widens).

Under such premises, Euronext Clearing's Liquidity Framework is based upon the following principles:

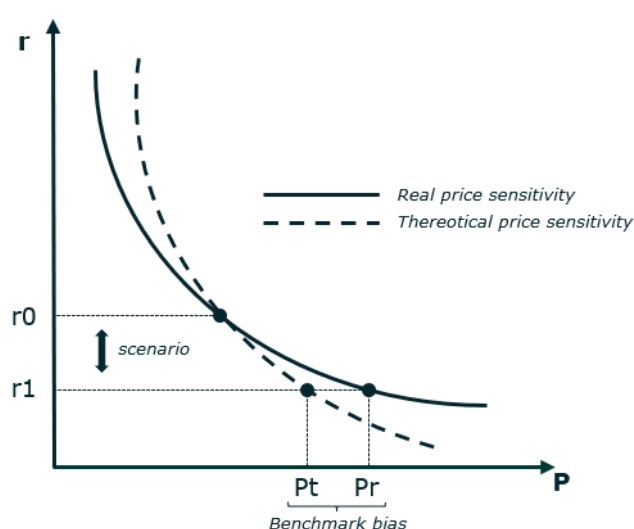
- 1) assessment of the potential bias underlying theoretical prices;
- 2) assessment of potential uncovered close-out costs deriving from bid-ask spreads.

In the following sections, an in-depth description is provided.

Potential bias in theoretical prices

As mentioned in the previous paragraph, theoretical prices used within the Expected Shortfall risk metric (as obtained through the employment of benchmark curves) may in reality be far from the actual realizations for specific securities. In particular, this may happen whenever such securities either have non-vanilla risk profiles or are traded under particular market sentiments. Moreover, when risk exposures are significant (and materially concentrated with respect to outstanding volumes), even less noticeable biases may be costly for the CCP to close-out:

Figure 1 : theoretical vs actual price sensitivity



The delta between theoretical and actual realizations in assessing the potential evolution of a security's price is tackled through the implementation of the Idiosyncratic add-on.

Triggering the Idiosyncratic add-on

As mentioned in the previous paragraph, the Idiosyncratic add-on is by nature triggered whenever the security under analysis either has a non-vanilla risk profile or when it represents a significant exposure (especially in relation to the amount outstanding of that ISIN, given that reduced market depth may exacerbate close-out costs).

In addition the above mentioned criteria, the Idiosyncratic add-on should also be triggered whenever the bid-ask spread profile of a particular security suggests that the theoretical vs actual sensitivity bias may be significant:

Table 2 : Idiosyncratic add-on - triggers

Idiosyncratic add-on		
Triggers	Principle	Scope
1) Non-vanilla risk profiles	This type of securities are likely to trade at prices that are materially different than the theoretical ones that could be obtained through benchmark curves	Inflation-linked bonds, floaters
2) Concentrated positions	For vanilla instruments, large concentrated positions may represent an additional cost for the CCP even for relatively small sized bias	Bullet bonds, ZCB
3) Wide b/a spreads	Widening bid/ask spreads may suggest that the security is likely to trade far from its theoretical price, representing an additional cost for the CCP when closing-out the trade	Bullet bonds, ZCB for which trigger number 2) is not already active
Holding period used in the Idiosyncratic add-on computation are a parametric function of concentration levels		

Triggers 1) and 2) in the above table have been already discussed in the relevant documentation for the Idiosyncratic add-on. Here below the full set of parameters is reported:

Table 3 : Idiosyncratic add-on - parameters

Country matrix		
Bond type	Concentration	HP set
Bullet/Zc	-5%	-
Bullet/Zc	5% - 10%	-
Bullet/Zc	10% - 15%	5, 6, 7
Bullet/Zc	15% - 20%	5, 6, 7, 8
Bullet/Zc	20% - 25%	5, 6, 7, 8, 9
Bullet/Zc	25%-	5, 6, 7, 8, 9, 10
Floater	-5%	5
Floater	5% - 10%	5, 6
Floater	10% - 15%	5, 6, 7
Floater	15% - 20%	5, 6, 7, 8
Floater	20% - 25%	5, 6, 7, 8, 9
Floater	25%-	5, 6, 7, 8, 9, 10
Linker	-5%	5
Linker	5% - 10%	5, 6
Linker	10% - 15%	5, 6, 7
Linker	15% - 20%	5, 6, 7, 8
Linker	20% - 25%	5, 6, 7, 8, 9
Linker	25%-	5, 6, 7, 8, 9, 10

Bid/ask spread trigger for the Idiosyncratic add-on

With regards to trigger 3) in Table 3, the underlying assumption is that wide observed bid/ask spread for a certain security may represent a significant clue that the security in question may be trading at prices which materially differ from the theoretical ones obtained through benchmark curves.

In particular, four different situations may be in place for vanilla securities:

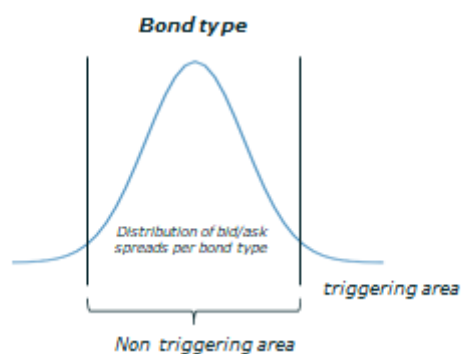
- 1) the security represents a concentrated position and the bid/ask spread is not relevant: Table 3 parameters are applied based on concentration band;
- 2) the security does not represent a concentrated position but bid/ask spread is wide: the minimum Holding period from Table 3 is applied in computing the Idiosyncratic add-on;
- 3) the security represents a concentrated position and the bid/ask spread is wide: the Idiosyncratic add-on is triggered as in case 1);
- 4) the security is neither concentrated nor the bid/ask spread is significant: the Idiosyncratic add-on is not triggered.

As outlined in the principles above, while non-vanilla securities will always result in the application of the Idiosyncratic add-on, bullet bonds and ZCBs may be exempted from it even under the framework that includes the additional third trigger (bid/ask spread).

In order for this framework to be implemented, it is of fundamental importance to define criteria through which the significance of the bid/ask spread can be assessed. In this context, it is also important to ensure that the aforementioned criteria can be coherently applied to all securities in a harmonized fashion.

Bid/ask spread thresholds are defined through the definition of buckets, with each bucket representing a whole category. The bid/ask spread threshold applied to each bucket is a specific percentile on the distribution of the weighted average (on traded amounts) of bid/ask spreads recorded for securities belonging to that specific bucket¹:

Figure 2 : triggering criteria for bid/ask spreads



Given the set of parameters defined by the Risk Management team in coherence with what already provided for the idiosyncratic add-on:

Table 4 : parameters for the construction of bid/ask spread distributions

Parameter	Value
Confidence Level	99.7%
Lookback Period	1 year (to be assessed periodically in order to evaluate potential APC concerns) ²

The distribution for each bond type is built comprising the weighted average of bid/ask spreads recorded over the defined lookback period for instruments included in that specific type/Time-to-Maturity bucket. The confidence level applied to these distributions allows to obtain the specific bid/ask threshold above which the computation of the Idiosyncratic add-on is triggered (if not already triggered as a consequence of concentrated positions as per above):

¹ As an alternative approach, the market could be enquired on acceptable thresholds per bond type.

² Currently set at 1 year in line with the lookback period employed for the Idiosyncratic add-on.

Table 5 : bid/ask spread thresholds

Country	Bond Type	Time-to-Maturity bucket	B/A Threshold ask (in basis points)	B/A Threshold bid (in basis points)
Italy	Bullet	[0yr, 2yr)	X_ask %	X_bid %
Italy	Bullet	[2yr, 5yr)	Y_ask %	Y_bid %
Italy	Bullet	[5yr, 10yr)	Z_ask %	Z_bid %
Italy	Bullet	[10yr, ...)	U_ask %	U_bid %
Italy	Linkers	[0yr, 2yr)	V_ask %	V_bid %
...	...	...	...	...
Country X	Bond Type U	[...)	W_ask %	W_bid %

It is worth mentioning that thresholds are also defined for those bonds for which the Idiosyncratic add-on is always triggered (non-vanilla risk profile) since, even if not necessary at a trigger level, it will be used at a later stage (see next paragraph).

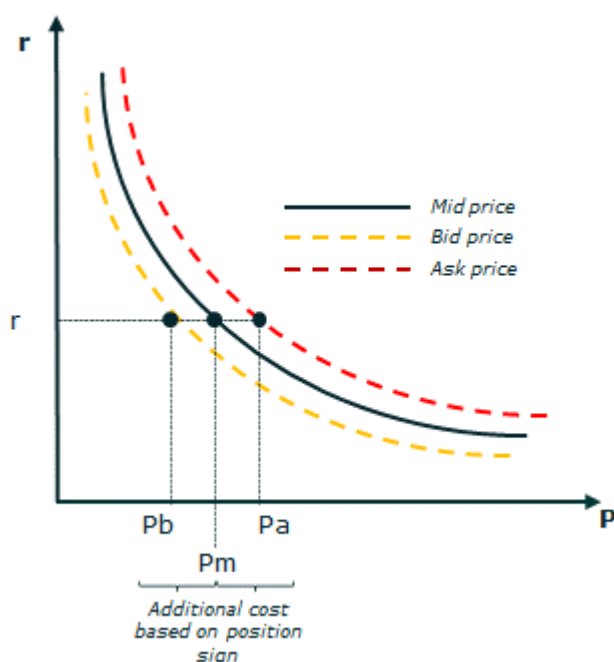
Table 5 is provided by the Risk Management team and it is updated on a regular basis.

During each trading day, for each security the weighted average of the bid/ask spread for that trading day is retrieved from the market. When the aforementioned daily indicator is bigger than the threshold defined for that security type, the Idiosyncratic add-on is triggered (if not already).

Bid-ask spread and close-out costs

As mentioned in paragraph 1, the CCP may incur in additional costs when finalizing close-out trades due to the fact that while re-evaluated risk positions are assessed at a mid-price level, market trade would actually eventually happen either at the bid or ask price:

Figure 3 : bid/ask spreads and additional close-out costs



In order to cover for this additional costs, a bid/ask add-on is computed for each position comprised within the margined portfolio.

Bid/ask add-on computation

For each traded security in the margined portfolio, the weighted average of bid/ask spreads is retrieved from the market. Apart from the potential triggering of the Idiosyncratic add-on, this metric is used to compute the bid/ask add-on at position level.

In particular, the bid/ask spread add-on at instrument level is computed as follows:

$$(1) BA_{addonISIN} = position_{amount} * (avgSpread_{bid}, avgSpread_{ask})_{sign\pm}$$

where:

- $(avgSpread_{bid}, avgSpread_{ask})_{sign}$ is the weighted average of bid/ask spreads for the for that ISIN recorded during the trading day, where $avgSpread_{bid}$ is taken for long positions (+) and $avgSpread_{ask}$ is taken for short positions (-) and where both are

computed as the distance in absolute terms of the mid-price of the ISIN and weighted average of bid/ask prices depending on the position sign;

- both $avgSpread_{bid}$ and $avgSpread_{ask}$ are expressed in basis points;
- in case of missing bid/ask spread for a given security, the relevant values in Table 5 are used.

The bid-ask add-on at portfolio level is then computed as follows:

$$(2) BA_{addonPTF} = \min(\alpha IM, \sum BA_{addonISIN})$$

where the α coefficient represents a Risk tool to be employed in order to limit potential pro-cyclical behaviours of the addon and it is set as a % of the overall margin requirement for each margined account.

Currently, the α coefficient is set at 10% of the margin requirement for a given account. The calibration of the parameter has been performed in an attempt to balance potential pro-cyclical concerns with the preservation of an adequate amount of collected resources.

Final margins at portfolio level

The bid/ask add-on is added as a debt to the other margin components and it is computed for both the ordinary and the $t+1$ margination rounds.

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