



Credit Risk Mitigation – Financial Collateral Comprehensive Method
Backtesting the regulatory haircuts

Credit Risk Mitigation – Financial Collateral

Evaluation approaches

Credit risk mitigation (CRM) techniques are used by banks to reduce the risk of credit exposures. Expectations in relation to the recognition of CRM in the calculation of RWA and capital requirements are set in the Basel Accords.

One method of CRM is to collateralise an exposure in whole or in part with financial collateral posted by a counterparty or by a third party on behalf of the counterparty. There are three possible approaches for banks to evaluate financial collaterals for the purpose of CRM that are prescribed in CRE22¹.

Simple Approach	Advanced Approach	Internal Models Approach (IMA)
<p>Financial Collateral Simplified Method</p> <p>The principle underlying the method is that the risk weight assigned to the collateralised portion of the exposure is replaced with the risk weight of the financial collateral (generally subject to a 20% floor). This method may only be applied to exposures where the credit risk capital is calculated under the standardised approach.</p>	<p>Financial Collateral Comprehensive Method</p> <p>Under this method the exposure amount is reduced by a volatility-adjusted value ascribed to the collateral. The volatility-adjustments (or haircuts) are prescribed in the regulation. This approach can be used for exposures where capital is calculated under either the standardised approach or IRB approach.</p>	<p>Counterparty Credit Risk Models</p> <p>Under this method banks develop an internal models method for counterparty credit risk. This requires the calculation of conservative estimates for the value of the exposure and the value of the financial collateral at the time of its realisation. To use this approach a bank must gain the appropriate supervisory approval.</p>

The eligibility of a financial collateral instrument is dependent on which of the three evaluation approaches is chosen.

Financial collateral instrument	Approach required for eligibility
i) Cash or gold.	Simple, Advanced, and IMA
ii) Debt securities that are deemed to have sufficiently good credit quality.	Simple, Advanced, and IMA
iii) Equities (including convertible bonds) from a main index.	Simple, Advanced, and IMA
iv) Equities (including convertible bonds) that are not included in a main index but are listed on a recognised exchange.	Advanced and IMA
v) UCITS ² and mutual funds where the price is quoted daily.	Simple, Advanced, and IMA
vi) UCITS ² and mutual funds that include equities described under point iv).	Advanced and IMA

1) CRE22: Standardised approach: credit risk mitigation

2) Undertakings for Collective Investments in Transferable Securities

Financial Collateral Comprehensive Method

Backtesting the regulatory haircuts

The Financial Collateral Comprehensive Method (FCCM) may be viewed as the most practical approach for evaluating financial collaterals because of two reasons: firstly all the possible financial collateral instruments are eligible for use under this approach; secondly, the bank does not need to develop an internal estimate of the value, as haircuts that are prescribed in the regulation are applied instead. In order to use the FCCM, a bank should demonstrate that the prescribed haircuts are conservative. Two possible methodologies to do this are outlined below:

Method 1: Analysis of Realised Cashflows using Internal Data

Use internal data from defaulted customers who had deposited financial collateral to test if the regulatory haircuts are conservative. Compare the realised cashflow of the liquidated collateral against the original market value of the collateral with the haircut applied to calculate if an exceedance occurred. The following condition should be true:

$$CF < (1 - H_v - H_{fx}) \times MV$$

Where CF is the realised cashflow from the liquidated collateral, H_v and H_{fx} are the regulatory volatility and foreign exchange (fx) haircuts respectively and MV is the market value of the collateral prior to liquidation. The haircuts must be scaled to the correct liquidation period.

Pros

- This approach only requires internal data that should already be held by the bank and therefore does not require data from external sources.
- As internal default data is used, the methodology is tailored towards checking if the haircuts are conservative for collaterals held by the bank.
- The approach takes into account the correlations between the volatility and fx haircuts and also the cost of realising the collateral.

Cons

- A bank might not have enough data (both during a downturn period and a benign period) on defaulted customers where financial collateral was realised for the results to be conclusive.
- Data must be sufficiently granular (e.g. customer's collateral composition or bond credit quality) otherwise significant assumptions are required to be made.

Method 2: Analysis of Historical Returns

Use historical prices of financial collaterals to compare their returns against the regulatory haircuts. If the negative return of the collateral is greater than the regulatory haircut than an exceedance is observed. The following condition should be true:

$$\frac{V_{t+l} - V_t}{V_t} < H$$

Where V_x is the price of the financial collateral at time x , l is the liquidation period, t is date of default, and H is the regulatory haircut.

Pros

- This approach does not require internal data, therefore if a bank does not have sufficient data or there are internal data quality issues then new data can be acquired externally.
- Because external data can be used results can be obtained for collaterals that may not have been historically deposited at the bank, as well as those that have historically been held but have limited internal data available.
- Results can be calculated for both downturn and benign periods.

Cons

- This approach does not take into account any costs that are incurred from the realisation of the collateral.
- The method does not account for correlations between the volatility haircuts and fx haircuts as they are tested separately.
- Time series for some collaterals might contain large period of missing values and not be complete.



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