

Integrated counterparty risk measurement on the basis of a hybrid model

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Example of a medium-sized German bank illustrates a new way of quantifying counterparty risk

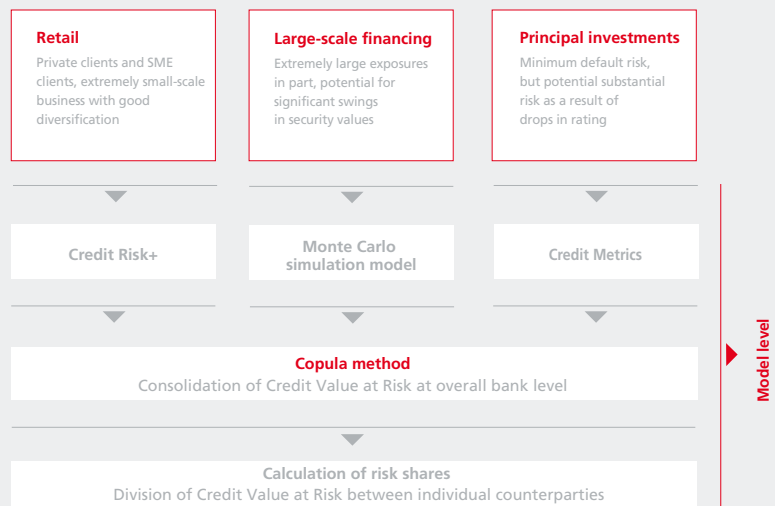
Credit Value at Risk has become increasingly significant in terms of bank controlling, in turn raising the question of how this process can be integrated into a comprehensive controlling system. The subsequent essential factors are comprehensive risk assessment, consistent methodology and an integrated view. This means that the diversification effects at an overall bank level need to be appropriately considered as opposed to the individual Values at Risk of various portfolios. This is also necessary for calculating the risk-bearing capability.

In response to these requirements, ifb has developed the following hybrid model in cooperation with a medium-sized German bank. Firstly, the relevant counterparty risk portfolios were identified and linked to various appropriate risk models. Next, the results at an overall bank level were aggregated, whereby diversification effects were also taken into consideration. The thus determined Credit Value at Risk was then divided into individual positions as a basis for managing the credit risks. The aim of the project was to comprehensively measure the Credit Value at Risk of all the bank's credit portfolios, whereby the specifics of the corresponding risk models and also their inter-diversification were appropriately taken into account.

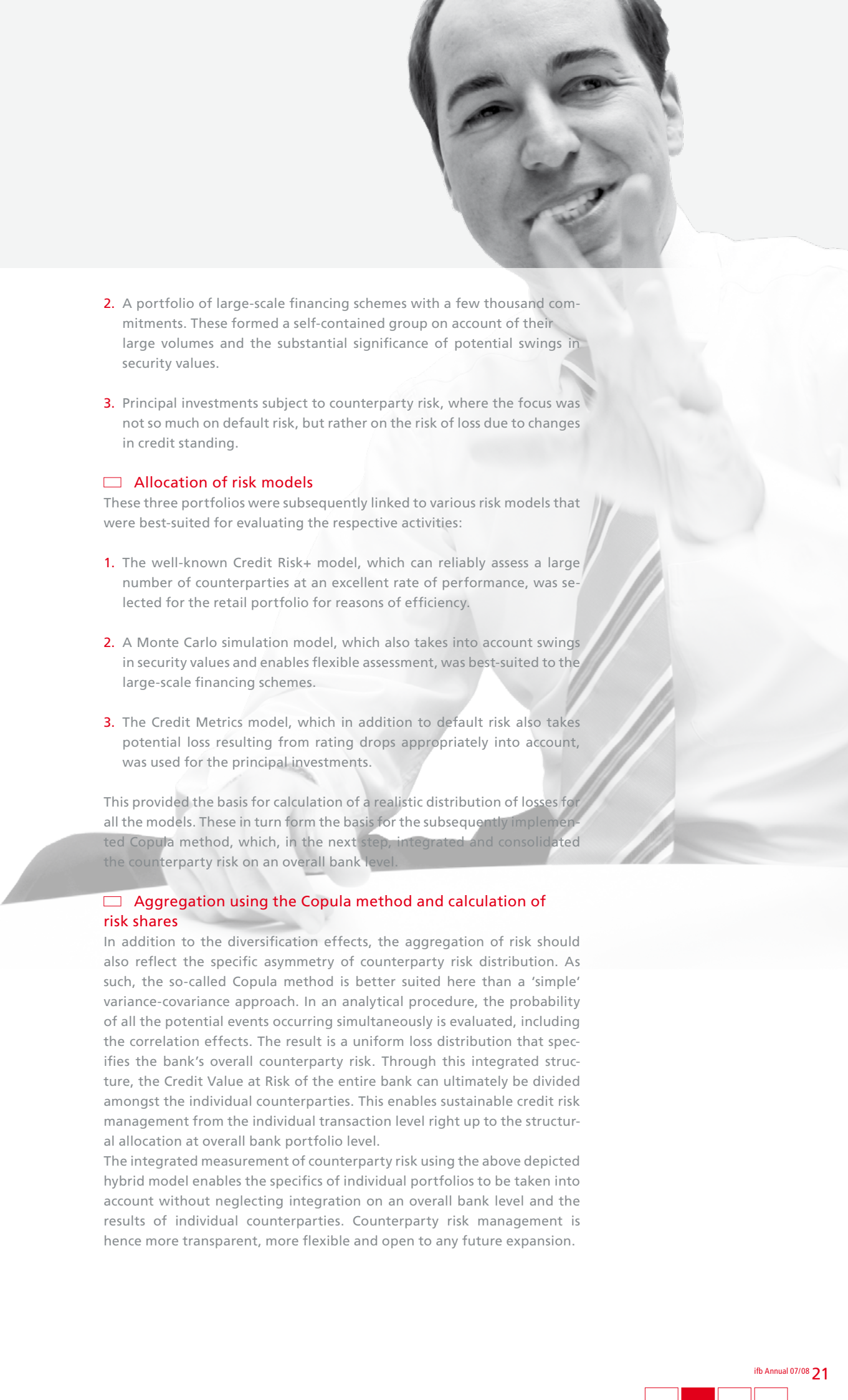
□ Identifying the portfolios

The basis of the hybrid model is formed by the division of the entire portfolio into a number of sub-portfolios that are uniform in both context and structure. In the project described here, three groups were identified:

1. A retail portfolio comprising several hundred thousand counterparties, whose exposure distribution and rating structure was both homogeneous and well diversified.



Using the three portfolios 'Retail', 'Large-scale financing' and 'Principal investments', the hybrid model facilitates the integrated calculation of Credit Value at Risk.

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2. A portfolio of large-scale financing schemes with a few thousand commitments. These formed a self-contained group on account of their large volumes and the substantial significance of potential swings in security values.
 3. Principal investments subject to counterparty risk, where the focus was not so much on default risk, but rather on the risk of loss due to changes in credit standing.

Allocation of risk models

These three portfolios were subsequently linked to various risk models that were best-suited for evaluating the respective activities:

1. The well-known Credit Risk+ model, which can reliably assess a large number of counterparties at an excellent rate of performance, was selected for the retail portfolio for reasons of efficiency.
2. A Monte Carlo simulation model, which also takes into account swings in security values and enables flexible assessment, was best-suited to the large-scale financing schemes.
3. The Credit Metrics model, which in addition to default risk also takes potential loss resulting from rating drops appropriately into account, was used for the principal investments.

This provided the basis for calculation of a realistic distribution of losses for all the models. These in turn form the basis for the subsequently implemented Copula method, which, in the next step, integrated and consolidated the counterparty risk on an overall bank level.

Aggregation using the Copula method and calculation of risk shares

In addition to the diversification effects, the aggregation of risk should also reflect the specific asymmetry of counterparty risk distribution. As such, the so-called Copula method is better suited here than a 'simple' variance-covariance approach. In an analytical procedure, the probability of all the potential events occurring simultaneously is evaluated, including the correlation effects. The result is a uniform loss distribution that specifies the bank's overall counterparty risk. Through this integrated structure, the Credit Value at Risk of the entire bank can ultimately be divided amongst the individual counterparties. This enables sustainable credit risk management from the individual transaction level right up to the structural allocation at overall bank portfolio level.

The integrated measurement of counterparty risk using the above depicted hybrid model enables the specifics of individual portfolios to be taken into account without neglecting integration on an overall bank level and the results of individual counterparties. Counterparty risk management is hence more transparent, more flexible and open to any future expansion.