

Subprime crisis as a case in point: how stress tests create liquidity risk transparency

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For extreme crisis cases, statistical models should be supplemented by stress tests

Using the subprime crisis as an example shows that liquidity risk management needs further development. In order to be sufficiently armed for corresponding developments on the financial markets, stress tests must be introduced to supplement statistical models such as Liquidity at Risk. This would facilitate early simulation and forecasting of the extreme crisis situations that could well lead to the insolvency of a bank.

□ Statistical models in a normal situation

Liquidity management is based on the gap analysis (funding matrix), which involves the comparison of cash inflows and outflows in time bands. In Germany, subject to specific requirements, MaRisk and the new Liquidity Regulation (Liquiditätsverordnung) allow banks to measure and report liquidity risk using their own procedure instead of standard methods. Depending on the business model and situation of the bank, this procedure may vary greatly. As such, there are no standard guidelines that bind all banks. In normal situations, the new statistical models such as Liquidity at Risk are important supportive procedures.


□ Stress tests for a crisis situation

However, in crisis situations statistical models should be supplemented by the appropriate stress tests similar to the market price risk environment. The Committee of European Banking Supervisors (CEBS) has consequently put forward a number of basic scenarios. These include the following market-induced scenarios: problems in the inter-bank market, withdrawal of a key market participant from a specific market, the shortage of liquid funds in a specific market and the collapse of a significant currency. In addition the following bank-related scenarios were suggested: a drop in the bank's credit rating and subsequent rise in refinancing costs, a higher level of commitments, an increased outflow of deposits and diminishing credit lines.

On the theory and practical application of stress tests in banks, see also the following book published by the ifb group:
Claus Stegmann,
Kai-Oliver Klauck (Hrsg.):
Stresstests in Banken.
Von Basel II bis ICAAP,
Schäffer-Poeschel,
Stuttgart 2006.



The subprime crisis and its various stages: stress tests afford transparency at an earlier stage in relation to crises and any subsequent consequences affecting liquidity.



A combination or sequence of these or similar scenarios could develop into a crisis that, in turn, could lead to a liquidity risk.

In terms of overall bank management, an attempt should be made to define these basic scenarios with identical parameters used for other stress tests, for example, those employed for market price risk.

□ Examples from the subprime crisis

Using the individual stages of the subprime crisis as an example, the following shows how various prime risk stress tests could be used to map such a scenario (for the different stages, see also the illustration).

Between 2004 and 2006, the Federal Reserve (USA) increased the interest rate no less than 17 times. Primarily, such a move leads to short-term outflows on the liabilities side; the resulting market price risk can be simulated using interest rate shifts or spreads. However, the interest rate hikes also led to an increased propensity for counterparty default as the burden on real estate credit based on variable interest – widely used in the USA – increased perceptibly. The appropriate stress tests show, with a specific time displacement, the probability of key borrower default or cluster risks within the portfolio. Consequences within the funding matrix are delays or defaults in payment, with further losses also incurred through price losses in relation to securities – for example, collateralised debt obligations (CDOs), with which credit risks relating to mortgage-based loans are securitised on the capital market – or generally through the illiquidity of financial instruments and markets. These can be simulated using additional stress tests (market price risk, exchange risk).

Market participants reinvested in secure government bonds, which in turn caused a loss of effective yield. As a result of the markets for CDOs and ABS drying up, the subprime crisis intensified, with a drastic reduction in new business and inter-bank credit lines. For financial institutes specialising in subprime loans, the impact has been massive: liquidity reserves have fallen and refinancing has only proved possible subject to tough conditions. This in turn damaged the reputation of the relevant banks, resulting in a reduction of its credit rating or withdrawal of credit lines. It is for this reason that also intrinsic risks caused by external events or operational risks, such as loss of reputation, have to be taken into consideration in stress tests.

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□ Conclusion

Through appropriate modelling of the primary risk drivers, stress tests enable liquidity risk to be mapped and managed. This integrative approach to the diverse basic risks is still in the development phase in many banks. In future, supervisory law will increasingly focus on more advanced processes for measuring liquidity risk and the corresponding stress tests. Banks with flexible and open IT architectures that enable integrative and transparent views of source and result data using various solutions will have the edge.