

High Tension

>> Including Stress Tests in Risk Management

Ulf Clerwall, Junior Manager
Julien Tattevin, Consultant

Editorial

We are returning to our favorite topic, **the review of risk management as a global company management tool**.

Naturally, where financial risks have to be considered at a management level, extreme risks have to as well.

In this month's newsletter, we will analyze the fundamentals of such cases, not forgetting that quantitative and statistical data can sometimes appear to be weak.

In this issue, we will focus on liquidity risk (our very favorite!) linked to the notion of confidence.

We wish you a pleasant read.

Fayna Lionet
OTC Conseil Americas

Want to know more?
Check out our Website for full versions of these articles.

www.otc-conseil.com

/Publications/Articles



Directing an economic operation, whether financial or not, today means taking into account uncertainties with regard to the risk factors on which the operation is built. After a financial crisis and the economic recession that follows, it is important to ask ourselves the real level of financial and non-financial institutions' risk-taking, their vulnerability with regard to the collapse of potential markets on which they depend, as well as the impact of their behavior on the economic and financial system.

The current crisis has especially highlighted the need to include analyses of extreme uncertainties in risk management in order to turn these analyses into a genuine management tool. The "stress tests" label applies to this kind of approach.

In order to illustrate the issues raised by this approach we will focus on liquidity risk (an institution's capacity to finance asset growth and honor its commitments at maturity) which has now emerged in the banking sector. Indeed, the crisis has revealed the close link between this risk and a banking establishment's solvability (the spectacular bankruptcies of Lehman Brothers and Bear Stearns) as well as the connection between institutions' individual risk and systemic risk.

Building a management tool

Liquidity risk offers a good example of the difficulties in constructing stress tests, in their implementation and their integration as a genuine tool of management. The example requires us to look at three challenges:

- > Developing stress models that provide the most faithful picture possible of the establishment's business and of its associated economic balance sheet
- > Defining and managing stress scenarios that fit with management as extensions of the situation and overall economic climate in which the business finds itself at a given moment
- > Integrating stress tests into daily management entails a significant change in culture, even for banking establishments, which are already accustomed to managing risks. For non-financial establishments, developing stress test procedures may represent a first step toward a genuine risk-management framework where few mechanisms of this kind had previously been used.

Developing appropriate stress models

Building stress models starts from the same principle as constructing any other kind of model: a cartography of risk factors relevant to the business. However, the latter is of particular importance in this context because the range of risk factors accounted for is most probably wider than in the case of models applied in a normal period.

In crisis periods we thus often see risk factors that were not observable in normal market conditions. The situation in which certain assets become illiquid offers a good example of this.

It is just as necessary to reconsider interactions among risk factors. Indeed, as a general rule, periods of stress reveal heightened levels of interactions between risk variables, such as the rise in correlations between stocks or economic sectors during a downturn in the markets.

In other words, developing stress test models doesn't boil down to "shocking" the inputs of pre-established risk models, but should instead mean a willingness to enlarge the range of analysis in terms of the number of risk factors and of the quantity of interactions. This suggests having recourse to modeling techniques that put the financial variables closest to the establishment in relation with their economic fundamentals.

Take the example of liquidity risk: Building a stress model means identifying any risk factor – on the assets and liability side – that may cause a balance sheet discrepancy, which no less includes all the traditional risk factors (market, credit, interest rate, etc.).

Principles for developing scenarios

Once the risk factors have been identified and the models established, the next step is defining scenarios. The main principle of a stress test is to simulate a given crisis scenario in order to evaluate its impact on the system in question, to identify the vulnerabilities of the system, and to consider the means by which these might be reduced. The fundamental question is, therefore: How do we determine the relevant scenarios?

The simplest approach is to reproduce the parameters of past crises in the models and, from there, to deduce the impact on the business (an **historical scenario**). Although regulations require this approach of banking establishments, it raises questions about a business's capacity to anticipate future crises. Indeed, nothing shows that past crises will repeat themselves, nor that the same conditions will mean the same thing and have the same impact as past occurrences.

Another main principle of stress scenarios – **hypothetical scenarios** – requires anticipating a crisis by imagining its parameters. The approach brings to the fore the concept of plausibility, which expresses a subjective perspective neglected by probabilities, aiming at limiting the imaginary as much as possible to realistic scenarios. In practice, hypothetical scenarios often take the form of an extension or a modification of historical scenarios whose plausibility can be evaluated via the statistical and economic relationships among risk factors.

Managing scenarios and analyzing impacts over time

Apart from the difficulties involved in enlarging and enhancing the scope of models, developing stress models and implementing them is now a task that banking institutions have in fact mastered. On the other hand, turning stress testing procedures into genuine management tools requires two major steps:

- > Refining hypothetical future scenarios into "forecasts"
- > Integrating into the modeling the timeframe in which the latter are relevant.

In other words, it means developing plausible scenarios as continuations of the current state of affairs.

The stress test scenarios are most of the time, expressed in a static and a temporal way, in the form of simple fluctuations in key variables (stock prices, inflation, interest rates, liquidity of markets) or through probability laws designed to account for tail-end distribution events, combined with well-chosen copulas in order to create dependency between random variables. Nothing here that differs much from classical methods whose incapacity to anticipate complex events is revealed with each new crisis.

A necessary change in risk management culture

Risk management culture has become very much centered on the quantitative, leading us to lose confidence in risk analyses that aren't based on formal quantitative models and to have too much confidence in these models, without necessarily taking into account their validity conditions or their weaknesses.

The narrowness of this perspective was perfectly illustrated in the period following the bursting of the internet bubble to the first warning signs of the 2008-2009 crisis.

During this crisis, the banking sector was focused on implementing Basel II in line with a risk culture very much oriented to sensitivity-type indicators (P&L, VaR, etc.).

Concurrent with the excessive focus on models adapted to normal market conditions, we also siloed risks (market, credit, liquidity, operational risks, etc.) and prevented ourselves from seeing the connections and the interactions between the different categories.

As it has evolved, risk management has forgotten the expertise combining qualitative analysis, which, although less dependable in appearance, may be more robust in fact, and quantitative analysis (see "**Liquidity and Confidence Risk**" below.)

We are working towards creating a discipline focused on the fundamentals of the systems studies and on the practice of structural analyses. Analyses of which have been founded on the understanding of the dynamics of interdependencies between both economic and financial variables that run across the economic balance sheets of financial and non-financial institutions.

Developing stress test procedures offers the perfect leverage to bring about a transformation of the risk management culture in any kind of business.

Reformulating and remapping risks, by restoring their full multi-faceted dimensions, represents a real challenge for any economic establishment accustomed to operating according to this or that particular approach – VaR for market risk, rating methods for credit risk, etc.

By definition, stress test exercises provide the opportunity for business managers to challenge their certainties and received ideas concerning the market environment.

In short, these stress tests represent an important factor towards financial stabilization, even when they allow businesses to take the necessary risks implicit in bets on the future involved in every investment decision ●

>> Liquidity and Confidence Risk

When we deal with finance liquidity risk, we quickly realize that the issue of the conditions in which a company finds itself incapable of respecting its financial commitments is not at all trivial. In theory, a company that is solvent but lacking liquidity, should always be able to find a source of financing and should, therefore, only have to worry about the cost.

The reality is more complex. An economic agent doesn't lend money solely based on his faith in a well-ordered balance sheet, but rather on the basis of how he foresees the balance sheet evolving. On one hand, the increased granularity of information included in the balance sheet leaves a lot of room for uncertainty with regard to the actual status of the borrower. On the other hand, the uncertainty inherent in every attempt at forecasting necessarily brings with it a certain share of subjectivity.

The decision to grant a loan or to deposit savings cannot therefore be justified by simply calculating one's hope in eventual profit. The process also brings into play a complex and difficult-to-quantify notion: the lender's confidence in the borrower and the latter's business sector.

The notion of confidence has been much studied by economists because it brings up an issue that is more fundamental still, that of the link between economics and the social sciences. According to O. Williamson, confidence is useless in explaining economic decisions once calculativeness becomes possible. This is supposed to be the case in all economic and social exchanges, excluding interpersonal relations.

In our opinion, confidence is a key point to consider in thinking about the organization of the financial system that has come out of the crisis: a key to understanding what has put liquidity risk back at the heart of current preoccupations, a key to understanding the dead-end to which excessive quantification of the world leads, a key to rediscovering the link between finance and economics, between economics and society.