

Spotlight on Managing Market Risk

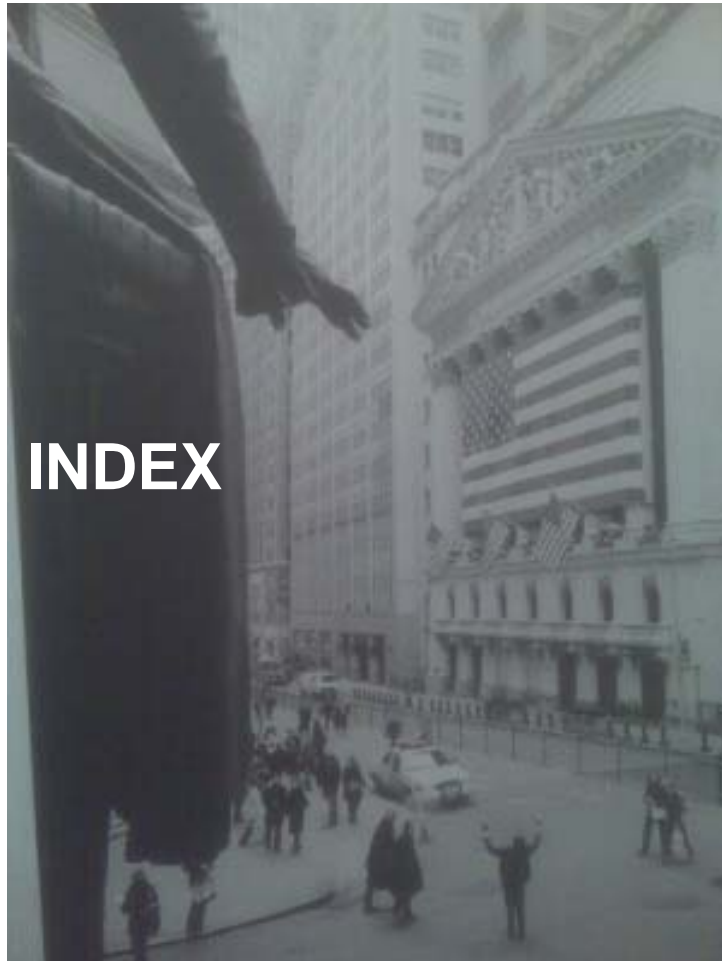
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David Murano

Director of Market and ALM Risk Management, Global Risk Management, “la Caixa”

Professor, Institute of Financial Studies, Barcelona

GARP Regional Director, Barcelona



A broken market

Managing risks moving forward

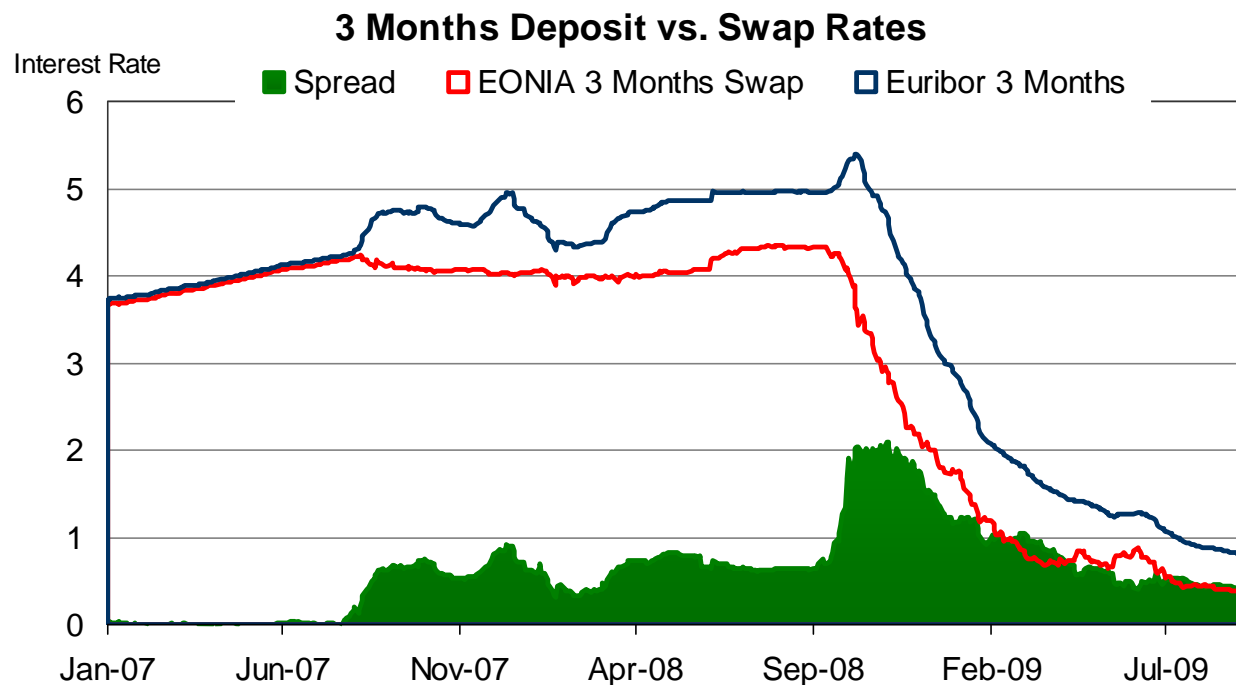
Conclusions

The views expressed in this presentation and during the conference are strictly personal and do not reflect those of my employer or the organizations with which I collaborate.

A broken market

“The problem here is something that looked to be a very solid edifice ... did break down. And I think that, as I said, shocked me. I still do not fully understand why it happened.”

Alan Greenspan. Hearings before Congress, October 23rd 2008.



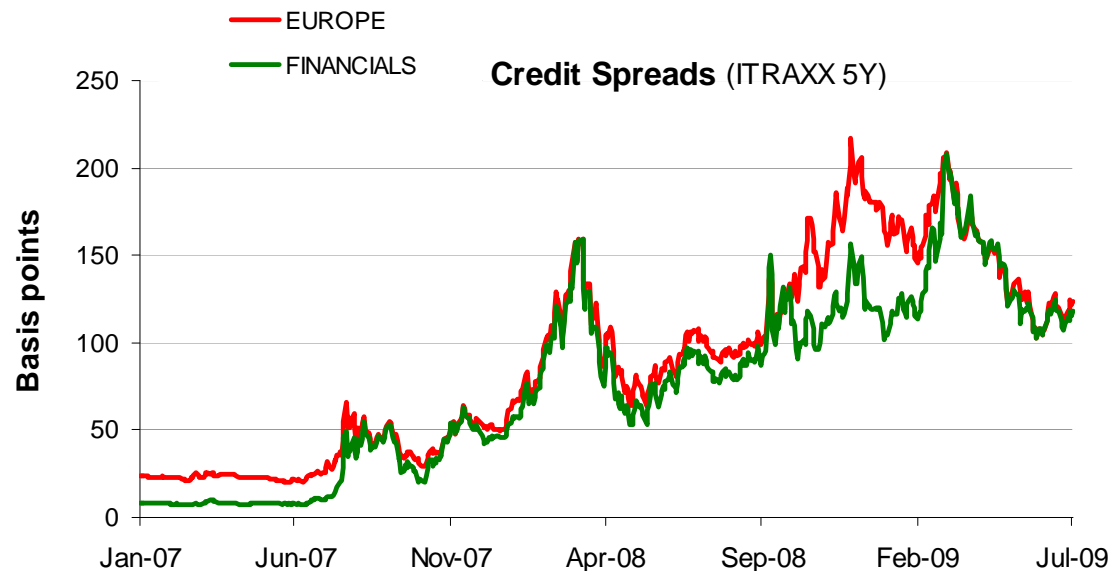
The spread between deposit rates among top European banks (principal is exposed) and swap rates (only interest is considered and most trades are collateralized) shows the confidence (or lack of it) of the banking system.

The current situation is far from normalized.

A broken market

“The major flaw of our type of economy is that it is unstable. The dynamics of a capitalist economy which has complex, sophisticated, and evolving financial structures leads to the development of conditions conducive to incoherence – to runaway inflations or deep depressions.”

Hyman P Minsky. *Stabilizing an unstable economy* (1986)



The banking business requires cheaper financing than its clients in order to be profitable.

This relationship must be stable as otherwise the financial system is incoherent.

Also, excess volatility in credit spreads creates financial insecurity and damages growth.

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“It is not from the benevolence of the butcher, the brewer, or the baker, that we can expect our dinner, but from their regard to their own interest.”

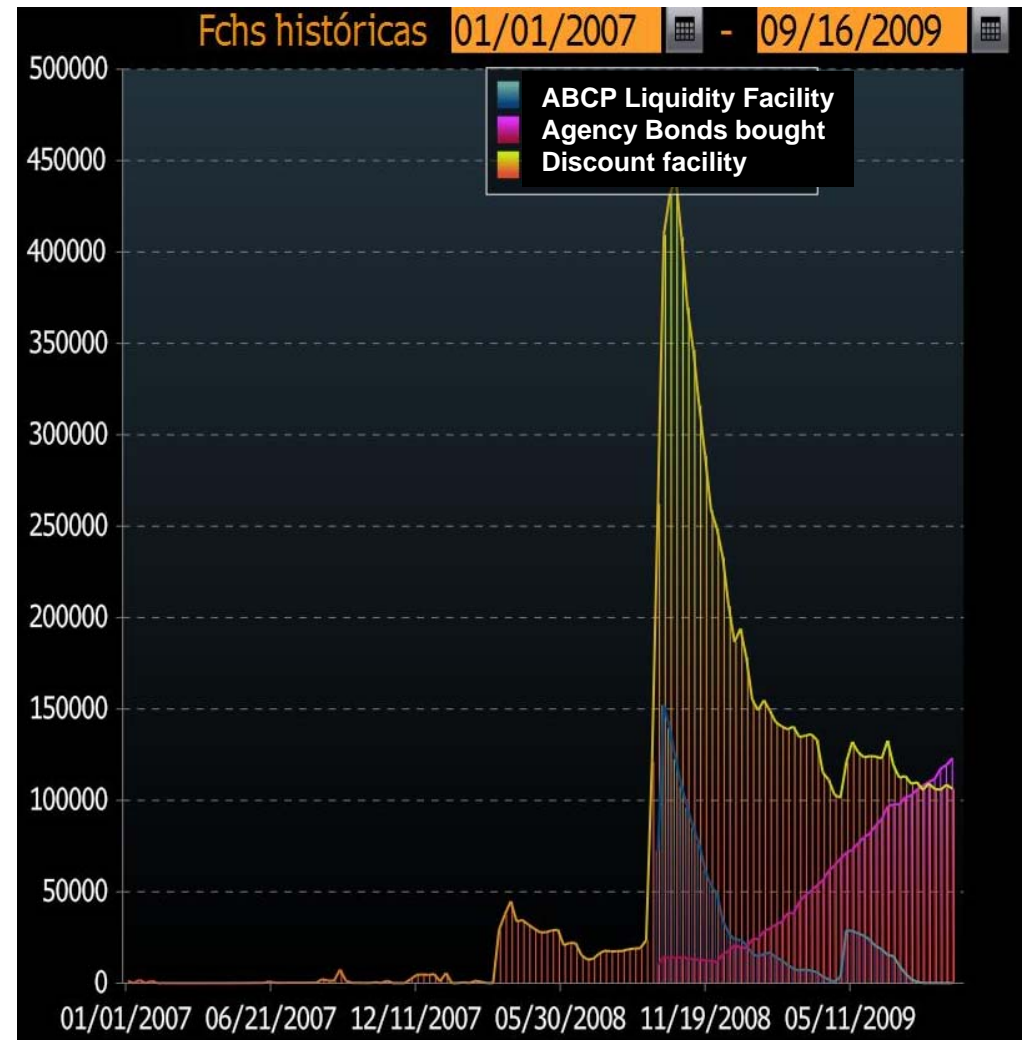
Adam Smith. *The wealth of nations* (1776)

- **In a capitalist society, greed is not a crime** but a fundamental element of economic growth. The ethics issue goes well beyond the banking business.
- Banks need to default if we are to grow through “creative destruction”, as Schumpeter popularized. The banking industry is expected to work hard bringing financial innovation in order to create value. Innovation has risks and, therefore, regulation needs to include change management processes.
- **A system in which banks never default is more expensive in the long term** as it requires higher margins, and therefore, less credit. It is also a recipe for future inefficiencies.
- Effectively, we live in a single financial market. Therefore, **competition through pricing makes banks’ risk standards converge or banks go out of business.**
- **Only regulation can provide a level playing field.**
- Moreover, certain risks, such as contagion risks, cannot be properly assessed by financial institutions. These risks should not be included in banks’ models and should only be managed at the level of regulators.

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“Market participants themselves must address the fundamental sources of financial strains - through deleveraging, raising new capital, and improving risk management - and this process is likely to take some time. The Federal Reserve's various liquidity measures should help facilitate that process indirectly by boosting investor confidence and by reducing the risks of severe disruption during the period of adjustment. Once financial conditions become more normal, the extraordinary provision of liquidity by the Federal Reserve will no longer be needed. As Bagehot would surely advise, under normal conditions financial institutions should look to private counterparties and not central banks as a source of ongoing funding.”

Ben S. Bernanke. Speech, May 13th 2008.



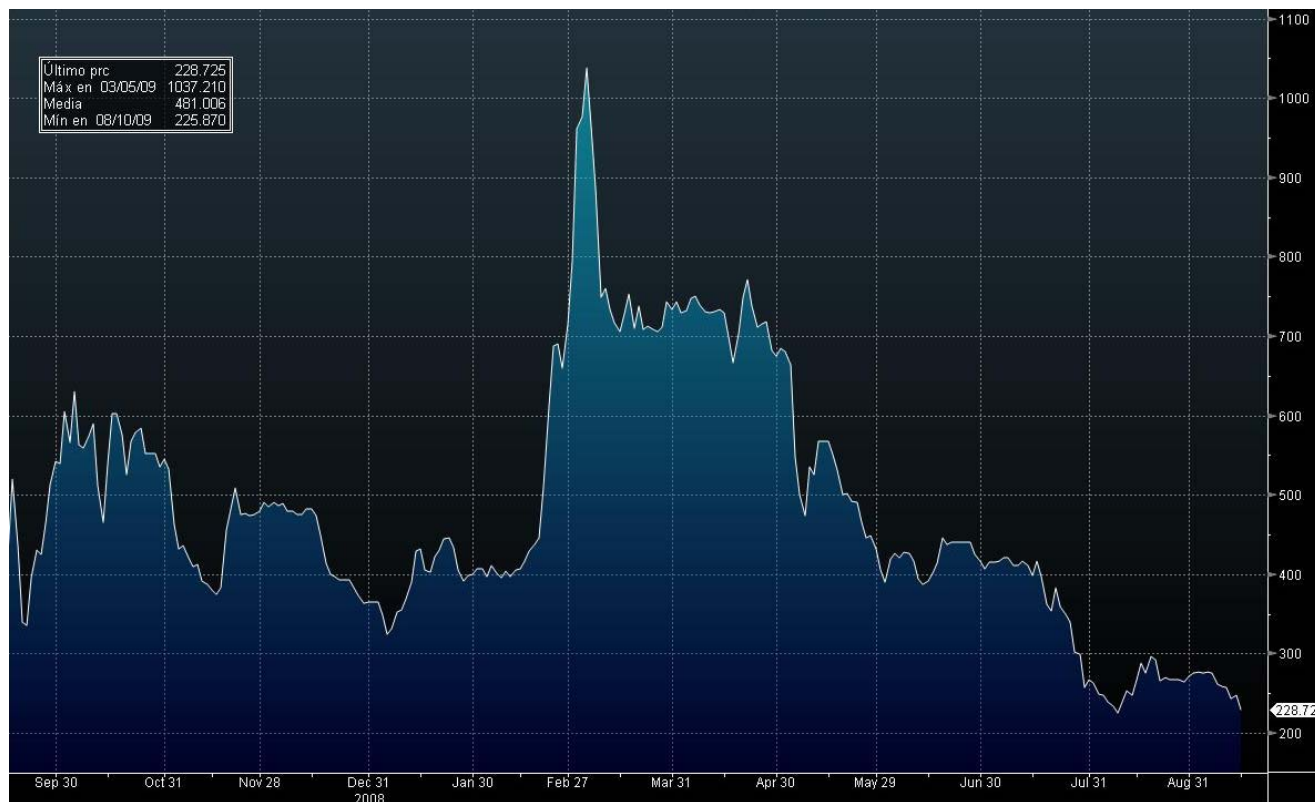
Financial institutions still require assistance

A broken market

- Central banks have taken extremely unusual steps, providing financing in exchange for assets that are now known to be much riskier than previously envisioned, and don't significantly amend the haircuts applied.
- It is not that easy to go back to normal. **Without an extremely high degree of confidence, the interbank market cannot function as before.**
- Interbank loan volumes are tied to the dynamics of banks' balance sheets, which creates liquidity needs of a magnitude that is not necessarily in accordance with banks' equity. Therefore, capital oriented risk measures in this case become useless. Instead, there must be strong control processes in place.
- This situation simply shows the nature of banking as a leveraged business, in which equity is relatively small compared to its assets and liabilities.
- One feasible explanation for the historically low interbank rates before August 2007 is that they were assuming government support.
- In a way, no risk manager could really authorize an interbank loan of say a 10% of capital (regulations accepted 25%, and in some countries it was even higher if they were short term) without assuming such government support. **It is important to understand the human nature of those responsible for taking such credit decisions.**

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An example of market disruption



General Electric Capital Corporation 5 years CDS

General Electric Capital bonds were heavily used as collateral when constructing synthetic collateralized debt obligations (CDO). GE Capital's status as a AAA rating issuer made it a popular collateral, as it was considered similar to a treasury and had ample liquidity. When CDO prices started going south, the illiquidity of CDO made them difficult to sell, depressing CDO prices even more. In order to hedge CDO positions, investors bought protection by using Credit Default Swaps (CDS). Normally CDS prices are similar to bond spreads as they have the same underlying, but in the case of GE Capital, CDS prices were much higher. On July 10th 2009, **GE Capital 5 years CDS was at around 400 basis points while GE Capital bond spreads were only around 100 basis points.**

Managing risks moving forward

“The mathematics underlying portfolio theory handles extreme situations with benign neglect: it regards large market shifts as too unlikely to matter or as impossible to take into account.”

Benoit B. Mandelbrot. *Scientific American*, February 1999.

- Practitioners and regulators have been using Value at Risk (VaR) as the main yardstick for measuring market risk. Parametric Value at Risk is a probabilistic measure based on volatility and correlations, and uses the same basic assumptions as portfolio theory, which considers that market returns follow a normal distribution.
- However, **price changes are not distributed in a pattern that conforms with the bell curve**. The number of substantial price changes is higher than what a normal distribution would forecast.
- Big price jumps are more common during certain periods. **Price charts show volatility clusters**, which are incoherent with the assumption that daily returns are statistically independent.
- **The very high percentiles of loss distributions (the probability of highly unlikely losses) cannot be estimated in a reliable and robust way**. The difficulty is not technical but of fundamental nature.
- Also, many event risks are not captured in 1 year historical data periods, which VaR uses.

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“Value at Risk should be summarily exorcised.”

Pablo Triana. Financial Times, September 7th 2009.

- **Mandelbrot claims that fractal geometry creates a more realistic picture of market risks.** Fractal geometry describes the shape of coastlines and the patterns of galaxies.
- However, the estimation of parameters used in fractal models is tricky and choosing different parameters can provide significantly different outcomes. **The theory is nice but the application seems to be unfeasible**, which takes us back to square one.
- **But banks are in the business of taking risks, and risks need to be assessed.**
- Stress Tests simply apply prudential changes to the portfolio and are not linked to current market conditions, which is what VaR tries to cover.
- The power of VaR measures is not necessarily VaR itself but that there is no practical answer to the question “what else is there?”.
- **A large loss is not evidence of VaR failure** as VaR does not describe the distribution of losses beyond the quantile.
- If one has a VaR model that has behaved well despite the crisis, as some banks do if we check their backtesting, **maybe there are cases in which VaR can still be applied.**
- **However, it is clearly necessary to review when VaR is used and to reconsider its role as the primary risk measure.**

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“The search for the right fat-tails distribution at best gives us a more accurate view of the static part of our risks. As such, it is in some ways equivalent to shrugging our shoulders and saying ‘shit happens’.”

Research Monthly. RiskMetrics Group, April 2009.

- VaR models were initially used in trading rooms as a measure of risk for liquid positions at a one day horizon.
- However, the use of VaR models has been extended to cover illiquid positions and assets with high material event risk. Also, they have been used to set regulatory requirements. Both uses do not seem to comply with VaR’s initial nature and model assumptions.
- As a measure created by an investment bank, it is designed to be highly reactive to market conditions and, as such, it should help to forecast today’s possible losses based on current market data. **By definition, it is made to be procyclical, which is a characteristic that regulation wishes to avoid.**
- It is of no use to extend VaR’s horizon or to suggest using data from a longer period (to include more than one cycle) as it then stops serving its main purpose: to provide an assessment of current risks to the trading room.
- **Value at Risk should be thought simply as a warning signal** and, as such, not as a tool for setting capital requirements.
- In general terms, banks that used VaR models that are reactive (short period of historical data and volatility calculated using EWMA rather than MA methods), did better during the crisis.

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“We believe that material event risks cannot be captured by VaR, but alternatively can be captured by suitable risk-based methodologies (including add-ons).”

Goldman Sachs. Letter to Basel Committee, March 2009.

- The Basel Committee on Banking Supervision has issued guidelines for financial institutions to capture the risk of credit defaults and rating migrations. The new measure, called Incremental Risk Charge (IRC) has the following characteristics:
 1. It will be an add-on to the current Market Risk calculations.
 2. It will be applied to unsecuritised credit products in the trading portfolios.
 3. It will assume a constant level of risk over a one year capital horizon.
 4. It will measure the losses at a 99.9% level.
- As the IRC uses a long-term horizon and a stressed confidence level, it is not properly Value at Risk because it can't be backtested and is not truly a probability measure.
- Material event risks should be evaluated through stress testing.
- **IRC results are going to be different from those obtained with a rigorous stress testing program.**
- Parallel to the regulatory requirements, an alternative measurement system, based on stress testing, needs to be put into place by practitioners for obtaining sensible information.

Managing risks moving forward

“The best Wall Street minds and their best risk-management tools failed to see the crash coming.”

New York Times, January 4th 2009.

- **Risk Management must include macroeconomic analysis** as part of its assessments. For example, if housing prices have increased 100% over the last eight years, risk managers need to have some awareness of it when considering structured products with residential mortgages as underlying.
- We need to be able to **write an analytical commentary** about our portfolios, based mainly on our understanding of the instruments and the market factors affecting them in the current economic environment.
- When using mathematical models, it must be a priority that they truly work based on their assumptions, and can be proved through backtesting. Our judgment will inevitably be influenced by their results.
- Stronger controls on model risk are necessary. Models need to be stressed tested.
- Validation teams with a good understanding of market dynamics need to be put in place and their views must challenge models. **An understanding of market dynamics and their impact on models is essential.**

Managing risks moving forward

“...firms that performed well through year-end 2007 generally shared quantitative and qualitative information more effectively across the organization. Some firms were consequently able to identify the sources of significant risk as early as mid-2006.”
Senior Supervisors Group. Observations on Risk Management Practices during the recent market turbulence, March 2008.

- Understanding the positions of our portfolio means **discussing the risk factors** that affect it to ensure that no risk factors are missed.
- A key tool for understanding risk factors is to **perfectly explain the results**. It is necessary to daily compare market valuation with fair value or analytical valuation to prove that all risk factors and their changes are considered.
- Any differences found when explaining the result should be used to challenge our understanding of the instrument.
- **Daily mark to market is not simply a valuation** exercise but a key component for identifying risk sources.

Conclusions

- In a capitalist system, it is ultimately the regulators' responsibility to ensure that systemic crises do not take place and to control contagion risks.
- Value at Risk should be restricted to what it does well, and be used as a warning for liquid portfolios at no more than one day horizon.
- Event material risks or tail risks should be treated through a well structured and properly argued and documented stress program, with constant discussions.
- Market Pricing versus Fair Valuation is the key tool for risk identification.
- A cooperative organization that has in-house expertise and shares information is the best protection against unnecessary future losses.

Thank you for your time.