

# Going for broke

## Risk management takes many shapes

### ALT ASSETS

BY PIERRE SAINT-LAURENT



Société Générale loses \$7 billion CAD due to the untoward actions of one single trader employee (or so it's claimed). Bear Stearns takes a massive financial hit following the collapse of two internal hedge funds heavily invested in mortgage securities. The asset-backed commercial paper saga continues, with the market frozen and no trades ensuing until agreement is reached amongst the participants in the Montreal Accord (aka the Crawford Agreement).

For risk managers, VaR is the *lingua franca* of comparing and commingling risks.

Many more elements could be pointed to, but the consequences of what is called the subprime debacle (the current credit crisis) has, no doubt, affected you in some way, in the micro-level – whether through investor unrest, lost portfolio value, and the like. On the macro-level, experts, it should be recalled, are still debating if the U.S. is headed towards a recession, carrying us with it in some way.

One possible conclusion is that all this is part of the normal course of the business cycle, that an economy will run up, create significant momentum (the phase during which even the proverbial dart-throwing blindfolded monkey is making a lot of money), generate an asset bubble, which will then deflate. (Call this sentence 'economic cycles for dummies'.) However, it seems that the trigger event for the subprime crisis is the steady buildup in relatively ill-understood exposures, which then has considerable ripple effects throughout the banking industry (and then on all the rest of us in the financial world and it trickles down from there).

It's not hard to find numerous examples of market vicissitudes that can be traced back to ill-understood, unmanaged, or imprudently accepted exposures.

One has only to remember 1997-8, with the Asian contagion (the currency crisis that was triggered by the Thai Baht and made its way around the region), and

the Russian bond default episode.

Although these events did not, in themselves, trigger a recession (remember the context: this was the height of the Internet "New Economy" and a book entitled *The End of Inflation* was being released), they can be thought of as contributing significantly to the speculative, sometimes almost maniacal Zeitgeist of then.

In fact, these events contributed to the formulation of the U.S. Federal Chairman, Alan Greenspan's, oft-repeated December 1996 quote on irrational exuberance and Robert J. Shiller's remarkable thesis on the same idea, as captured in his famous 2000 book of the same title.

It seems to me that we can apply a macro view to market cycles, and perhaps a more micro view. Let me explain.

The macro view is somewhat "passive," at least from an investor's or an investment firm's point of view. Besides the Banks of Canada and the Feds of the world (monetary policy) as well as the different state governments (fiscal policy), there is not much you and I, or investment firms for that matter, can do about the business cycle.

The micro view is, on the other hand, perhaps more actionable from an individual point of view. It stands to reason that the Sociétés Générales, Barings Banks, LTCMs and other market participants should be responsible and accountable for their own internally generated behaviours. Although this may not change the market cycle, ultimately, it certainly would contribute to smoothing it out. Call me a dreamer, but I would think that avoiding the subprime collapse in itself would have been a significant market stabilizer.

This is where, I believe, risk management comes in. And risk management takes many forms, well beyond calculations of value-at-risk (VaR) and other mathematical applications.

But what is VaR? Increasingly, investors and participants in financial markets know the answer. It's a concept that stems from banking regulations set forth in the late 1980s.

Very simply, VaR is the answer to the question: What is the worst that can happen?

So, what *is* the worst that can happen? It is the quantile of a statistical distribution.

Let's take an example and figure

out the VaR for an investment in a stock (the principle applies to a mutual fund, a bond, or pretty much any investment).

Take the track record of the Nasdaq 100, and let's look at 1,387 of its daily return observations. Rank these returns on a graph, from the lowest to the highest. What you will obtain is a bar chart: average returns will occur more frequently than extreme returns. Please see the illustration to the right.

In fact, with enough data, this bar chart will start looking like a bell curve, otherwise known as the normal distribution (or perhaps a skewed or otherwise deformed bell curve).

Once you've sorted the data, you can basically select a cutoff percentage, say 5%, as in the illustration to the right. What, then, is your answer to: "What is the worst that can happen" question? That at a 5% statistical significance level (or 95% confidence level – it means the same thing), the worst returns will be at the -4% mark. In other words, "once in twenty," if the future is exactly like this past track record, you should expect to see -4% returns (these are on a daily basis).

VaR is a neat concept, because it's simple and very intuitive. However, note the assumptions: the future will be like the past, we can identify a precise cutoff, etc. Identifying what happens "once in twenty" does not tell us what happens "once in one hundred," which could be far worse.

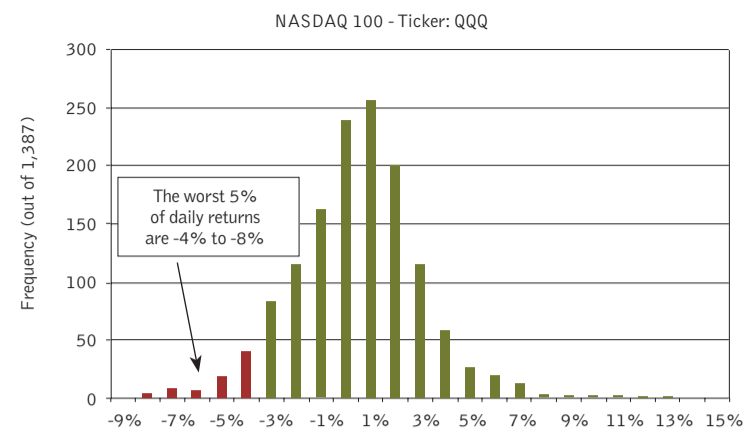
That's why there is a complementary concept: expected shortfall, which is the average of returns below the VaR threshold value. Expected shortfall may give a better sense of "on average" what is the absolute worst that can happen.

Another benefit of VaR is its universality. For risk managers, it is the *lingua franca* of comparing and commingling risks emanating from utterly diverse sources of exposure: equities, bond and credit instruments, options, currencies, etc. In effect, VaR is the least common denominator: it is the simplest metric that can be applied to most types of risk exposure.

But the biggest drawback of VaR is precisely its (relative) simplicity. It is simple because of all the assumptions underpinning it. Remove these, and the computation of VaR takes a radically more complex turn.

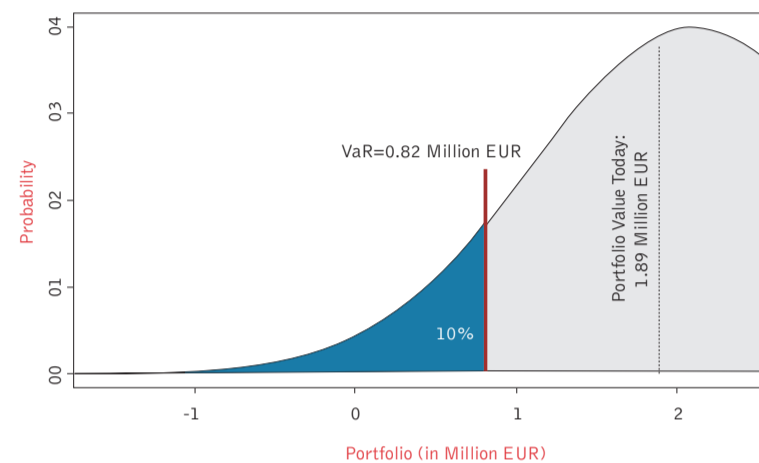
Moreover, estimating a VaR for options, complex-structured products, CDOs, and the like, is anything but simple. In fact, some of the best finance quants are

### DISTRIBUTION OF DAILY RETURNS



Source: Investopedia

### 10% VAR OF A NORMAL CURVE



Source: GFDL, Thomas Steiner

spending considerable time and effort refining the relevant VaR models. If you want to get a sense of just how complex it can get, I urge you to pay a visit to [www.GloriaMundi.org](http://www.GloriaMundi.org). You'll see instantly what I mean.

Modelling of market risk and credit risk (in a nutshell, the risk that fixed income instruments default, and what recovery value then applies) is advanced. Less so with operational risk. This can range from errors in clerical entries to the impact of losing the CEO – quite a broad range, which is particularly difficult to model.

Operational risk represents, in this sense, the new frontier of risk management, as both quantitative assessment and practical risk mitigation remain true challenges.

But what does it all mean? Why should you care? I submit that risk management needs to become ingrained in the culture of asset management and investing, much as it has become a daily endeavour in the banking world.

In fact, I believe that a culture of risk management is one of the most important developments in the financial industry. First, it's good business. Advisors need to show investors what the risks are, realistically. And VaR may help in this.

Admittedly, VaR used in isolation amounts to voodoo finance.

Admittedly, VaR used in isolation amounts to voodoo finance: in itself, it means very little as it is based on serious assumptions and its value rests on a certain set of data, or even possibly on a direct assumption of the underlying data distribution. However, placed in the context of looking out for risks using as many approaches as possible – experience, data, models, statistics – VaR can be helpful in triggering a discussion of "what is the worst that can happen."

More generally, the industry needs to agree that risk management makes good business sense. As risk-related liabilities and lawsuits mount, it will become ever clearer that a business approach that includes risk management optimizes the return-risk equation for investors, minimizes liability outcomes for the firm, and increases investor realism in expectations. This all leads to a better industry.

In the final analysis, Nobel prizes were conferred in finance for the fundamental notion that extra return comes at the price of extra risk. This is one of the most robust tenets of all financial knowledge. Market participants, alas, forget it at their own... risk.

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