

Take the Economic Capital “Cosmo Quiz”

In this month’s ERisk Report we look at how to assess the quality of Economic Capital numbers using a simple scorecard

This month’s quiz in *Cosmopolitan* is “What’s your risqué factor?” We at the *ERisk Report* rushed to take it, but to our disappointment found it had nothing at all to do with risk-based economic capital. So we decided to make our own version.

Not long ago, Economic Capital was viewed as an experimental approach to risk–reward optimization used by only the largest (and, frankly, not the most successful) financial institutions.

It’s now widespread throughout the industry, to the point where even regulators recognize Economic Capital as a basic building block to sound bank management.¹

Figure 1 shows ERisk’s estimate of the prevalence of Economic Capital frameworks in US and Canadian banking. The practice is nearly universal among US and Canadian banks with more than \$50bn in assets, including 18 out of 21 such banks for which ERisk has information (total population 27).

But it’s not just these big banks. Economic Capital has quickly become a standard practice for banks in the \$20-50bn assets category (ERisk knows of seven users and six non-users, from a total population of 20 banks).

Among banks with less than \$50bn assets, the number of Economic Capital users has more than quadrupled between 2000 and 2003. Now we are seeing the beginnings of a wave of adoption among banks smaller than \$5bn, including one bank with a balance sheet of only \$200m.

But the rapid evolution of Economic Capital techniques makes it tricky for banks to tell if they are doing it right, or if their existing approach has kept up with best practice.

Are you ready to be honest with yourself?

The aim of an economic capital framework is simple in principle. It should offer an accurate and complete measure of all the risks facing the bank, linking the result to the amount of capital required to meet the bank’s solvency target (typically expressed in terms of a credit rating).

In practice, most banks’ economic capital frameworks fall short of this ideal by:

- measuring risks wrongly because of weak methodology or data;
- not covering the full range of risk in the bank’s activities; and
- failing to convert the risk calculation accurately into a capital requirement.

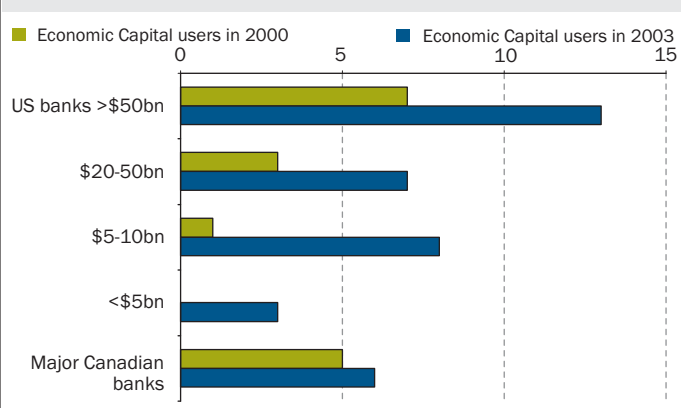
ERisk has surveyed this range of practice and built it into the seven-point “Cosmo quiz” reproduced on the back page of this Report. But before you score your own institution, let’s explain the approaches, and the reasoning behind the scoring on our quiz, in more detail.

Do supermodels get enough credit?

Credit risk is typically a bank’s most important source of risk. But many banks continue to guess at their true level of credit risk by using benchmark capital factors to calculate economic capital.

Sometimes these factors are determined through the judgment of management. Other times they are “borrowed” from another bank, or drawn from an external analysis based on benchmark

Figure 1: Are you feeling peer pressure on Economic Capital?



Take the Economic Capital “Cosmo Quiz” (continued)

1. Are you in denial about your fee-based business?

Nowadays, many banks have substantial non-traditional lines such as asset management, brokerages, mortgage banking, insurance broking, custody and data processing. It is tempting simply to exclude these businesses from the economic capital framework, especially if they are legally separated from the bank. But recent earnings volatility in some of these businesses (asset management and mortgage banking in particular) suggests this may not be wise. And anyway, one of the main purposes of Economic Capital is to provide apples-to-apples comparisons of businesses with disparate risks.

Some institutions have tried to cover non-bank risks by applying peer capitalization ratios from comparable but free-standing businesses (rather like the analog approach to operating risk that we recommend in the main text). Unfortunately it is very hard to find “pure play” businesses that can be compared and scaled realistically to the non-bank business lines we are concerned with here.

Instead, we should focus on the most important consideration: identifying embedded financial risks that might be correlated to other risks in the bank. An example is the danger that volumes in a mortgage origination business will dry up as interest rates rise. Such risks should be measured in line with the methodologies the bank uses to measure financial risks (eg, interest rate risk).

risk data and “correlated” to the bank’s internal ratings.

Using benchmark factors is better than using the 1988 Basel Accord’s flat 8% risk weighting across the board. But it’s still a lagging practice that can’t hope to capture the bank’s unique rating process, loss experience, portfolio composition or concentrations – and one that often fails to differentiate risk in terms of loan size, maturity, facility structure, or industry.

A first step in moving beyond benchmark capital factors is to estimate the volatility of credit losses. One very faulty approach to this, common a decade ago, is to measure the standard deviation of historical charge-offs.

Unfortunately it is impossible to assemble enough data to estimate charge-off volatility over multiple credit cycles. Even if this were possible, the data would never offer the consistency and sample size to allow us to slice it into useful buckets by rating, segment, and so on.²

Another mainstay of the industry is to employ an analytic formula – typically based on the square root of PD (the probability of default) multiplied by 1-PD – to estimate the levels of unexpected credit loss that a portfolio might suffer. With appropriate complexity, this approach can provide an accurate estimate of loss volatility. But it usually involves an unsatisfactory assumption about the shape of the bank’s probability distribution of losses.

The only way to arrive at the true answer is to calculate loss distributions from the bottom up, using a credit portfolio risk model. But even some of the most sophisticated bottom-up credit portfolio risk models, whether developed internally or by a third party, have gaps.

The most common gap is not dealing effectively with retail or small business loan portfolios. Models that require loan-level

inputs can be too cumbersome for large portfolios of smaller loans. As a result, these portfolios are often dealt with sloppily in a separate model, almost as an afterthought.

Even if the modeling is careful, the use of separate models for large corporate portfolios and retail/small business loans can mask concentration risk. For example, the bursting of the technology bubble could lead to losses on technology company loans at the same time that losses rise from loans to non-technology small businesses or individuals in technology-dominated regional economies (such as Silicon Valley).

But the most glaring gap in many credit portfolio risk models is the way they ignore the danger that default and “loss given default” rates will rise at the same time, especially in collateral-driven lending businesses such as commercial real estate and leasing. Best-practice models must take risk factor correlations into account.

Have you lost interest?

Most bank methodologies for measuring interest rate risk fail to capture the economic realities.

Gap reports fail to capture the economic effect of options embedded in a bank’s portfolio. Banks sometimes use net interest income simulation to get around this, but the typically short time horizon of these simulations can delude risk managers into ignoring significant mismatch risks beyond the simulation horizon.

The best approaches measure the change in the present value of all the bank’s positions relative to rate scenarios (often called an Economic Value of Equity or Market Value of Equity approach). A good EVE model will allow the bank to measure the mark-to-market impact of changes in the shape of the yield curve, rather than just the course of short-term rates over the next few years.

But even this framework may fail to measure income variability arising from basis risks, such as Prime vs. LIBOR or mortgage spreads.

Also, some models only allow the user to model a handful of deterministic “rate path” scenarios or yield curve “shocks”; yet interest rate positions can be a complex set of maturities, optionality, and spread risks. Monte Carlo simulation is typically required to capture the interaction of these risks.

Weighing the risks of an operation

Operating risk is the most difficult risk class for a bank to put a number against – and many institutions still don’t make a serious attempt.

The lagging practice here is to assume that the total amount of available capital is “right”, then to subtract Economic Capital for all other risks (credit, interest rate) under the assumption that operational risk accounts for all of the difference.

The problem here is that the answer begs the question. One of the most important functions of a firm-wide economic capital number is to help the bank decide whether it has the right amount of available capital.

At present, the realistic solution for most banks is to apply a top-down factor to estimate operating risk. This is similar in principle to the proposed Basel II “standardized” approach to operational risk, except that much better factors can be developed by looking to the capital structure of public companies that are good non-financial analogs to banking lines.

Crucially, these analog capital factors cover both event risks (eg, rogue trader, fraud, systems failure, etc) and business risks (eg, loss of market share, tighter pricing margins).

It’s important that the operating risk approach embraces business risk because recent studies suggest that business risk might be a more significant risk to banks than operational event risk.³

The banking industry might eventually succeed in building robust bottom-up models for both event risk and business risk – the ideal solution. But for the moment, it’s important that banks don’t fall into the trap of ignoring business risk entirely while spending lots of time trying to construct an over-elaborate, bottom-up approach to operational event risk.

Do you fake your aggregation?

After modeling all of these different risks, the final step in the Economic Capital framework is to aggregate them into a single measure of risk, and link this to capital.

The most primitive form of aggregation is to calculate Economic Capital for each risk individually, and add up the results. But this fails to capture important risk diversification benefits. For example, as credit losses rise in a weakening economy, falling interest rates may increase the value of long-term fixed-rate assets.

One blunt way of recognizing such diversification benefits is to multiply the aggregate economic capital number by a blanket diversification factor. A slightly better approach is to combine the risks according to a covariance matrix. The correlations underlying such diversification factors are more art than

science, though some banks have invested a lot of effort in measuring correlations from proxy indices or equity baskets.

Unfortunately, neither technique adequately addresses the diversification benefits that arise from the skewed shape of some individual risk probability distributions (notably credit risk, operational event risk and sometimes interest rate risk). To obtain an accurate picture of the overall probability distribution, the probability distributions themselves (rather than their standalone Economic Capital results) must be combined using Monte Carlo simulation or – ERisk’s preference – a carefully constructed numerical algorithm.

Our scorecard reflects a penalty for one other lagging practice: offsetting risk capital by an “earnings cushion” equal to each business unit’s expected earnings. This practice misses the fundamental point. Economic capital should reflect risk, which by definition represents a deviation from expectations, rather than the capacity to absorb risk.⁴

Don’t need a make-over? What if you’re already perfect...

Once you have scored your institution, you can use the weighted scores on the scorecard to identify areas for improvement that will yield the most progress.

Those institutions with scores that fall comfortably within the best-practice range can shift their attention to how efficiently they calculate and apply their economic capital numbers.

In terms of making the calculations, the lagging practice is to string together the results of a various home-grown and/or third-party models on a spreadsheet. This approach can be time consuming, vulnerable to error, and difficult to update.

The best-practice solution is an integrated application with appropriate controls on the modeling approach and on key parameters.

In terms of applying the numbers, the worst thing the bank can do is to let its Economic Capital numbers sit on the shelf. Economic Capital should be embedded in a range of decision-support tools at both the strategic and transaction levels (see Box opposite).

In the near future, as Economic Capital methodology becomes more standardized, the real issue to benchmark will be how aggressively banks apply their Economic Capital numbers to drive their business performance.

This article was contributed by Andy Hickman, VP and director of R&D at ERisk, who welcomes your comments at ahickman@erisk.com. For more resources, visit www.erisk.com/report

2. Application is everything...

Best practice banks should be able to put a tick against each of the following Economic Capital applications:

- optimal firm-wide capital management;
- risk-adjusted management incentives;
- strategic investment and risk transfer decisions;
- improved risk-adjusted pricing tools;
- analysis of customer profitability;
- investor communication; and
- regulator and rating agency compliance and comfort.

1 For example: Fed SR-99-18; New Basel Capital Accord: Pillar II; US joint agency subprime guidance, January 2001.

2 See ERisk Commentary, *ERisk Report*, November 2002

3 Andrew Kuritzkes and Hal Scott, "Sizing Operational Risk and the Effect of Insurance", working paper, Harvard Law School, June 2002.

4 See ERisk Commentary, *ERisk Report*, March 2003