Between RAROC and a hard place

Risk-adjusted return on capital, RAROC, has come of age. Rob Jameson profiles three institutions using it to manage their businesses

When ING publicly cited the perilously low risk-adjusted return on capital it was making from its investment banking division as a key reason for reining in the business last autumn, it marked a dubious coming-of-age for the RAROC methodology. And it drove some RAROC experts crazy.

"Raroc isn't only about bad news," says one, "at many banks, RAROC is equally the reason deals are being made, and businesses invested in." Practitioners involved in RAROC analysis say the methodology is about to emerge from a confusing period of limbo. Since it was trumpeted as a panacea for the banking industry in a rash of conferences and concept papers in the early 1990s, many banks have claimed they use it to manage their businesses.

But while the name lent them sex appeal, the technique employed outside leading-edge investment banks was often a little staid. Sometimes it was barely more than a formalisation of traditional risk/reward appraisals, with regulatory risk ratios plugged into the RAROC equation as a substitute for true economic risk. Even where economic capital was employed, the risk and return estimates from the various business lines were generally glued together using what one expert characterises as a "hodge-podge of dodgy assumptions and placeholders".

1. The RAROC equation

$$\text{RAROC} = \frac{\text{Risk-adjusted return}}{\text{Risk-adjusted capital}} = \frac{\text{Revenues}}{\text{Capital}}$$

Revenues
– expenses
– expected losses
+ return on economic capital
± transfer values/prices

Capital
capital reserved to cover worst-case loss (minus expected loss) to required confidence threshold (eg, 95%) for market, credit, operational and other risks

But it seems that a more rigorous form of RAROC calculation is now emerging. True RAROC feeds off a bank's underlying risk models and data, so as banks have invested more heavily in their risk infrastructure, it has become more worthwhile to improve on rule-of-thumb RAROC models.

At leading banks, economic capital RAROC figures are being re-engineered to take into account all risks – even operational risk – in a sophisticated way, and to drive decisions across all business areas. Some banks – CIBC, a leading Canadian bank, is one example – are now also pushing elements of RAROC analyses electronically out to their trading and corporate loan desks to help bankers see the incremental effect on economic capital of deals they are considering. This is a practical implementation of the virtuous circle that early RAROC modellers enthused about: economic capital influences frontline behaviour at the bank as well as offering senior managers a way to evaluate the performance of business lines.

This next-generation RAROC looks set to grow beyond a pace-setting elite. In the past couple of years the US regulators – and now the international regulators in the form of the Basle Committee on Banking Supervision – have been telling a much wider universe of banks that they must invest in robust data and models for calculating both regulatory and economic risk capital.

This will give RAROC modellers in many more institutions a secure platform of risk data to work from – but there is a fly in the ointment. Institutions grappling with RAROC around the world say that while it is important to get the formula right, RAROC analyses are part of a longer-term battle for hearts and minds in an institution.

The Swedish model

Anders Kragsterman is the Stockholm-based head of group risk control at Skandinaviska Enskilda Banken, where since 1994 he's helped to roll out ever more sophisticated approaches to risk-adjusted capital calculations. SEB is one of the largest banks in the corporate market in the Nordic area, and has ambitions to become a leading institution for savings, asset management and electronic banking in Europe.

Kragsterman recalls that a key motive for SEB in introducing risk-adjusted calculations was to be able to price products more keenly than its competitors.

"For the first two years, we tended to focus on using the approach at the transactional level in our credit businesses, particularly in terms of pricing large corporate deals," he says. The bank called its methodology "return on capital at risk" or ROCAR.

"After a couple of years, the focus shifted towards developing portfolio level and group level metrics, which led back to a new focus on using ROCAR in the business areas. From 1998 we have used economic capital as a basis

What spoils the RAROC recipe?

We asked some of the RAROC practitioners featured in this article and ERisk experts what tends to spoil the RAROC recipe. Here are their top five hates:

1) **Rule-of-thumb risk ratios** might be appropriate to a particular portfolio, or to an industry average, but they are not linked to the individual entity's actual portfolio or any fundamental model of risk. So they tend to under- or over-estimate risk, especially if such ratios are worked out at the transaction level and then simply summed to give a total. In the US, the Fed went so far as to explicitly declare this practice inadequate for "internal capital adequacy models", in its SR99-18 notice of July 1999.

Rules of thumb are also of little use in changing business line risk-taking behaviour. That's because unless it is clear which factors are pushing up economic capital in the RAROC equation, it's not clear what the business line can do to improve matters.

2) **Too little "thinking outside the box"**, for example, asset management businesses often come out of RAROC analyses looking favourable, because the only risk factor is assumed to be operating risk. But because an asset manager or a brokerage earns fees proportional to the assets in its customers' accounts, these profit centres in effect have a market risk position in the underlying funds in which their customers are invested.

Meanwhile, other business lines tend to be marked down unfairly. For example, the interest rate risk associated with mortgage origination profits has a natural hedge – when rates fall, the bank originates more business at richer pricing, and vice versa. Miscounting "big picture" risks like this most often happens when models are rooted in transaction-level risk analytics.

3) **A short-sighted focus on earnings** in risk modelling ignores possible changes in value, eg, net income simulations for asset/liability management that consider default risk only in credit risk models. While few firms can mark-to-market their P&L, these value changes eventually come out through earnings, eg, as a large "non-recurring" charge to restructure a portfolio.

4) **Adding up apples and oranges:** risk tends to be measured in each business line in a way that relates to that line's risk control needs. For example, trading value-at-risk might be calculated to the 99th percentile of the distribution over a 10-day period, while an asset/liability management risk measure might look at the effects of a 200 basis point jolt in the markets.

This makes sense for risk managing the individual business area, but RAROC relies on economic capital as a common currency of risk across an enterprise, which can only be achieved by using a consistent definition of risk in each instance of measurement.

5) **Poor accounting of risk diversification:** it's difficult to work out the interaction of different risks, such as market risk and operational risk, when trying to produce enterprise-wide RAROC numbers.

Many institutions simply add risks up, to be on the safe side. But adding up the Xth percentile of each distribution, in the hope that it will yield the Xth percentile of the total, flies in the face of the most fundamental of statistical laws, the Central Limit Theorem. ■

for allocating capital, and to develop performance measures for businesses," says Kragsterman. He wonders now whether it wouldn't have been better to introduce risk-adjusted metrics at group level right from the start. Now that the ROCAR measure is used at group level in SEB, he says, the business units have begun to think more naturally in terms of risk-adjusted pricing.

He says that his group's more idealistic hope when beginning the ROCAR project – that it could be used as the dominant decision-making tool across the bank – was off the mark. Now, he says: "It's clear that it should not be the only decision-making tool."

Early on, the bank was forced to recognise that competitive pressures can make it difficult to follow ROCAR pricing in certain sectors – "in mid-market loans, really the price is set by the market" – and remain a significant player. According to Kragsterman, the problem eased in the late 1990s, as more of SEB's regional competitors began to adopt risk-adjusted pricing.

On the other hand, SEB's early adoption of ROCAR meant it was able to pick the business it wanted and to encourage business lines to use risk mitigation mechanisms, such as collateral, wherever possible. It also helped the bank identify the businesses it wanted to grow. And in some business segments, ROCAR quickly became the key determinant of SEB's pricing strategy.

Kragsterman says this was particularly true of major structured finance deals with larger corporations. This kind of tailored business can rarely be related directly to a market price – which meant that the ROCAR model was both more important in setting a price, and less challenged by market forces.

While SEB's early experiments with ROCAR concentrated on the credit side of their risk portfolio, market risk was quickly factored in. And for 2001, the bank is extending its methodology to incorporate operational risks in a sophisticated way. These operational risk numbers won't be used in transaction pricing for some time, but with ROCAR figures now published internally for each business line every quarter – by risk type and business unit – it's clear that risk-adjusted returns are now embedded in SEB's planning process.

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This is particularly true of capital-hungry units. On SEB's Web site, the Nordic Banking units – a mix of traditional corporate and retail business – are said to be operating "in a mature market, which means that continued work to increase cost and capital efficiency has the highest priority for this group". Meanwhile, the bank's asset management & life unit "operates in a growth market" and seems to be given a freer hand.

Going forward, Kragsterman says it's good that the Basle reforms will bring regulatory capital closer more in line with economic capital, but he does not think the regulators have moved quite far enough "for us to see a real convergence".

SEB continues to calculate return on regulatory capital as a secondary metric. However, its real challenge is to calculate return on economic capital across its business areas in a way both easy to understand and robust. It's a difficult balance – but if line managers can't understand the approach, Kragsterman says, RAROC can't gain acceptance across a bank.

Wachovia on the road to RAROC

Russell Playford, head of the portfolio management group at The Wachovia Corporation, confirms that his institution also uses RAROC. Wachovia is a second-tier US bank headquartered in Atlanta and Winston-Salem, NC, offering personal, corporate and institutional financial services. It's been developing its capital markets businesses over the past few years, and recently hit the headlines when it announced a rethink over whether it should be in the credit card business.

"Our model was developed largely in-house, but the methodology is consistent with that used by leading portfolio management banks," says Playford. "While we have in the past used it for the pricing of particular products, at this time its principal use is to determine risk-adjusted returns at the discrete company level."

He recognises one of the criticisms of RAROC – its dependence on historical risk data means it can be backwards-looking – but thinks that the criticism can be exaggerated.

"At the entity level, the methodology is not backward-looking. We are estimating economic capital based on a number of factors including forward-looking default probabilities; revenues are estimates of amounts to be received in the future. At the portfolio level, the economic capital is forward looking but for simplicity's sake we are using historical revenue numbers and therefore it has a somewhat historical bent," he says.

Playford says he'd be surprised if anyone used RAROC numbers alone to make critical decisions about the lines of business they wanted to be in. In the past few years, RAROC experts have acknowledged that the methodology has its limitations. Many of the technical wrinkles in the approach, such as taking account of the different risk and reward volatilities in diverse business lines, are becoming more tractable. But it's difficult to build some factors, such as the long-term value of a customer relationship, into the model. And an attractive RAROC figure doesn't automatically mean that a bank should build up a business: the business line might be hard to expand, or it might make little sense in terms of the institution's core strategy.

But Playford says his institution has become comfortable with the idea of allocating economic capital and that Wachovia is now "on a continuum" in its development of the methodology. As its data gets better, it will be better able to measure line of business returns, assist with allocation of capital and use RAROC information "as an input into the formulation of business strategy".

Swiss Re leads insurers into RAROC territory

Tom Wilson, New York-based chief risk officer with the Swiss Re New Markets (SRNM) division of reinsurance giant Swiss Re, has experienced this progression from robust economic capital allocation to a full-blown RAROC methodology.

> 'The way SRNM calculates its RAROC figures for financial and credit risks is essentially similar to the way banks calculate similar figures, but with some original twists'

He says that a risk-adjusted model for reserving capital was introduced into Swiss Re from 1994/5, and fully implemented in 1995/6, to cover credit, insurance and financial risks.

The key motivation in developing this initial model, says Wilson, was risk management rather than profitability analysis or better pricing. Swiss Re takes pride in its triple-A credit rating and wanted to be sure that it had the capital to be the "last man standing" in any industry shakeout.

But the robust risk-adjusted capital model also gave SRNM a platform on which to develop a sophisticated approach to RAROC – one of the first in the insurance industry. This full RAROC approach is now applied in SRNM for both product pricing and for risk-adjusted comparison of business lines.

Wilson says that the early adoption of RAROC by SRNM – relative to Swiss Re as a whole – partly reflects the greater benefits of using RAROC in a trading environment. But it's also because his division offers many different kinds of products, from credit derivatives to innovative insurance products, that might otherwise be difficult to price or compare in terms of their true economic returns.

He says the way SRNM calculates its RAROC figures for financial risks and credit risks is essentially similar to the way the banks calculate similar figures, but has some original twists.

On the downside, Wilson says that Swiss Re must be doubly sure that it takes into account any positive correlation between market risk and credit risk in its worst-case risk analysis. On the upside, the insurer is keen to take advantage in its portfolio of the relative lack of correlation between its traditional insurance liabilities and credit risk.

There's little reason, he says, to think that massive claims liabilities will happen at the same time as massive credit losses. This natural risk diversification comes into its own when an insurance business is run on a risk-adjusted portfolio basis, and helps to explain the increasing involvement of reinsurers in the global credit markets.

But Wilson says that when the

RAROC figures are rolled back out to the business areas for price-setting purposes, in the financial and credit markets, these specific diversification benefits are stripped out. "We don't want to buy credit risk by giving away our portfolio diversification benefits," he explains.

He also points out that RAROC's impact on pricing is more direct with some products than others. For example, it tends to be more influential in pricing, say, a large credit portfolio swap – where the economic value has to be determined by SRNM – than in pricing an individual credit derivative, where market prices are available.

At SRNM, the RAROC figures are now calculated for many of its products as a matter of course, and automatically enter the system of record. The RAROC figure is an important – often a governing – factor in the decisions made by Swiss Re's transaction acceptance committees when they review key deals. These committees provide a consistency in risk taking across products and business lines.

Has RAROC led to any tough decisions? Wilson says at present many insurance markets are at the bottom of their business cycle, with premiums low in risk-adjusted terms. He says, as for some bankers in the corporate loans sector, RAROC figures are important in helping Swiss Re select the risks that make most sense from an economic standpoint.

While no desk likes to turn away deals, Wilson says, "there's a general acceptance in Swiss Re New Markets that the RAROC numbers are, at the least, directionally correct".

Not all sweetness and light

RAROC practitioners think most of the big conceptual battles have been won in the RAROC debate, and they point out that – as a philosophy and rule-of-thumb, as much as a true risk metric – the methodology has already altered the way many banks approach their business.

But there's a new front opening up in terms of making RAROC watertight and consistent, and working out how institutions can approach it in a more rational way. This is partly a problem of bank politics and balance: making sure that senior managers support RAROC projects, that business lines are involved and that RAROC figures are neither rejected out of hand nor used uncritically.

Into the future, there's hope that institutions might be able to benchmark their RAROC results better against their peers – something that's difficult today because the figures are calculated and presented in so many ways. Lack of standardisation makes communicating RAROC to analysts and investors an uphill task and means that discussion within banks over RAROC figures can degenerate into political skirmishes.

As one UK bank, looking enviously over its shoulder at the economic capital calculations of its competitors, commented: "The problem with improving RAROC in an institutional setting is that, like the original approach, there's only any point to it if there's both winners and losers." ■

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Other resources

If you are viewing online, you can click through the hyperlinks

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