

## STRATEGIC OPPORTUNITIES IN RISK AND CAPITAL

At the moment, banks take many strategic decisions without fully understanding the costs and benefits of their chosen approach in risk and capital terms. This is true across a range of crucial decisions such as mergers and acquisitions, the setting of target credit ratings, credit limit setting and the use of risk transfer and credit protection such as credit default swaps and securitization.

To show how useful risk and capital analytics can be in optimizing these decisions, we set up a typical regional banking portfolio and ran some simple tests. We pictured our institution as a bank in the North East region of the US with some \$7.5 billion assets split evenly between retail and commercial lending (with the latter split evenly again between C&I and CRE).

We set the risk parameters of the portfolio along lines we've found to be typical for regional institutions in our client studies and through our analysis of historical risk data.

What could this bank learn by applying the latest economic capital modeling techniques to enterprise and credit portfolio decisions?

### CAPITAL ADVANTAGES OF GROWTH AND MERGER STRATEGIES

Regional banks that want to grow face an important strategic choice. Should they use their capital to grow business volumes in their local market (eg, through extending more loans to the same customers, or merging with a similar, local competitor)?

Or should they pursue the less common course of purchasing a bank in a different region, or with a different kind of credit portfolio? Most bankers understand that

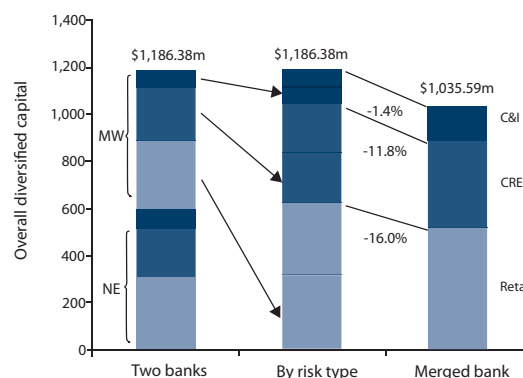
this second option will bring diversification benefits, but the scale of any such benefits is less obvious.

To point up the power of regional diversification, we analyzed what would happen to our North East bank if it acquired a bank of the same size with very similar portfolios in the Mid West.

A fall in credit economic capital can significantly drive up a bank's return on capital and the risk-adjusted returns of its businesses.

Our experiment showed that the credit economic capital of the merged bank fell by around 12% for its CRE portfolios and by 16% for its retail portfolios, compared to the credit economic capital that would have been required for two standalone institutions (Figure 1).

**Figure 1: Effect of bank merger on credit economic capital**



We set up this example to demonstrate the benefits from geographical diversification alone. In reality, two merging banks would gain many other risk diversification benefits from the differences in their enterprise risk portfolios. Additionally, two merging banks will likely consolidate operations to some extent, reducing costs as well as operational risk.

A fall in credit economic capital can significantly drive up a bank's return on capital and the risk-adjusted returns of its businesses - however, there are some real-world caveats. The most important of these is that bank capital adequacy decisions are constrained by regulatory capital as well as economic capital considerations.

All banks have to perform a tricky balancing act in terms of the credit rating they aspire to, their cost of funding, the risks they run, and the risk capital they hold against those risks.

This may be less of a drawback than it seems. First, bank regulators would likely take the bank's greater geographical diversification into account in their perception of the bank's risk profile (and therefore in quantifying the capital buffers they felt the bank should hold beyond minimum capital requirements).

Second, the bank would be able to ease its regulatory capital burden by investing in activities with good risk-adjusted returns that do not attract minimum capital requirements - in effect, putting its excess regulatory capital to economic work.

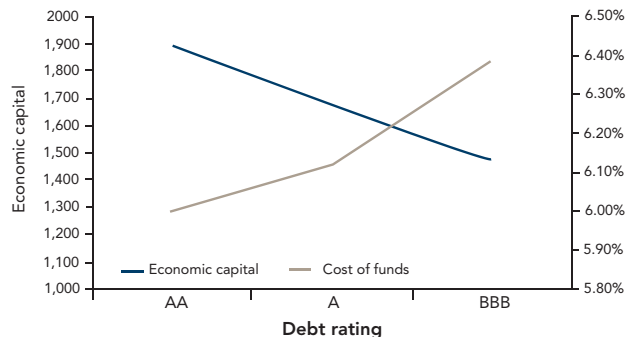
### SHOULD WE LOWER (OR RAISE) OUR TARGET CREDIT RATING?

All banks have to perform a tricky balancing act in terms of the credit rating they aspire to, their cost of funding, the risks they run, and the risk capital they hold against those risks.

These factors are interrelated and the tradeoffs between them can be tricky to understand. We used data from our example bank to make the relationships clearer.

In Figure 2, we can see that if our bank held a relatively low rating (eg, BBB), the amount of economic capital the bank had to hold would be much reduced (blue line). At the same time, as the bank's target rating fell, its cost of funding would increase (green dotted line). These two effects have opposite results on a bank's risk-adjusted return on capital (RAROC) - lower economic capital increases RAROC, while a higher cost of funds reduces it.

Figure 2: Ratings versus economic capital and cost of funds



Economic capital is a powerful tool here because economic capital calculations capture the true risk contributions of assets in a bank portfolio - and also capture the relationship between the bank's risk distributions and the amount of capital it has to hold to achieve a given solvency standard (or credit rating).

We then plugged our bank's economic capital results for each potential rating, and its cost of funding for the same rating, into a series of RAROC calculations to assess which strategy yielded the best results.

The results of this analysis are presented in Table 1, and show that this particular bank could optimize its overall RAROC by reducing its credit rating from, say, AA to BBB.

Table 1: Which rating produces the best Raroc?

	Economic capital	Cost of funds	Overall Raroc
AA	1,887	6.00%	21%
A	1,669	6.12%	23%
BBB	1,471	6.38%	26%

Not only are overall economic capital requirements higher at a stronger credit rating, but also the share of economic capital between risk types is likely to be a function of the credit rating. A good economic capital model should incorporate the nature of the risk distribution for each risk type, and allocate economic capital accordingly. Those risk types with "fatter tails" should be allocated a greater share of economic capital for stronger credit ratings.

Lending business units, exposed primarily to credit risk, likely have fatter-tailed risk distributions than business units exposed primarily to market risk - such as treasury.

Therefore, lending business units would be punished more than a treasury business unit, from an economic capital perspective, by a credit upgrade. For the example portfolio that we tested, credit risk accounted for 33% of overall economic capital at the BBB credit rating, but 38% of overall economic capital at the AA credit rating.

The optimal choice will be driven by the reduction in expected loss and economic capital costs achieved by removing a loan from the bank's portfolio.

### HOW CAN WE SHARPEN UP OUR CREDIT LIMIT SETTING?

Insights from risk-and-capital analytics can also be used to improve many practical decisions such as the setting of credit limits across the bank. To illustrate this, we looked at two very different portfolios in our example bank: consumer lending and C&I Technology lending.

In our example bank's existing portfolios, the largest consumer loan was \$1 million and the largest technology loan was \$20 million. What would be the risk capital effects of introducing limits of \$100,000 to the consumer portfolio and \$2 million to the technology portfolio?

We discovered that capping the size of loans in the consumer portfolio hardly reduced the risk of the portfolio at all, while capping technology loans reduced economic capital from 4% of exposure to 2.88% - a striking 1.12% benefit.

In the real world, the capital benefits of reducing limits would need to be balanced against the business implications of limiting the size of loans to important customers. However, our example makes it clear that banks can:

- use risk capital calculations to optimize limits for capital-intensive lending (rather than setting arbitrary limits)
- loosen or remove loan size limits for portfolios where limits are largely irrelevant to help business leaders grow portfolios and reduce red tape

### SHOULD WE PAY FOR PROTECTION - AND HOW MUCH?

As our next test, we looked at how our example bank might optimize risk transfer decisions in its commercial lending portfolio. It is tempting for banks to assume that their biggest or riskiest exposure is the best loan to purchase protection on, but this is not necessarily the case.

The optimal choice will be driven by the reduction in expected loss and economic capital costs achieved by removing a loan from the bank's portfolio - itself a complex function of various transaction-level and portfolio risk factors - compared to the cost of credit protection.

We therefore used an economic capital model to calculate the risk reduction benefits of removing a five-year, BB-rated industrial loan from our example bank's portfolio, and compared the potential savings to the cost of purchasing protection for the relevant credit default swap.

As it often does not make economic sense for banks to protect the whole loan, we modeled the benefits of protecting 40%, 60%, 80% etc, of the loan.

Table 2 summarizes the results for protecting 80% of the loan, and shows that there would be a marginal economic benefit from protecting this percentage of the loan, once the incremental swap cost is taken into account.

Table 2: Comparing costs & savings of protecting 80% of the target loan?

Exposure \$mm	EL %	EC %	Credit cost (5k)	Incremental credit cost	Incremental swap cost
25	0.05	2.56	94	88.30	86.97
5	0.05	0.40	5		

Ideally, the bank would apply the same methodology to other prominent loans in its portfolio to identify the strongest contenders for risk transfer.

This is a rational and economic approach to risk transfer decisions, but banks must take into account three important caveats:

- basis risk - Credit default swaps may pay out with reference to default on a particular debt instrument, rather than the loan in question
- maturity mismatch - the credit risk facing the bank might be of a different tenor to the liquid credit transfer instruments available in the market
- counterparty credit risk - there is some danger that the credit default swap provider may itself default at the time that claims are made against it

For relationship reasons, banks that are capital constrained or approaching their credit limits may decide to transfer credit risk to the market even if the cost of doing so does not make economic sense when viewed in isolation. However, in such a case, the bank should apply the above approach so that it knows the exact economic cost it must set against any expected future business benefits.

We also explored how our example bank could use a variant of this approach to select which retail portfolios the bank should securitize. Once an economic capital model is in place, it is relatively simple to run enterprise calculations 'with' and 'without' a given portfolio to reveal the potential benefits in terms of a reduction in enterprise economic capital.

However, there are some critically important real-world caveats here, too, because banks must model the risk of

any retained 'residual' assets and the prepayment risks associated with any retained servicing rights.

## CONCLUSION

The banking industry has invested heavily in developing risk-and-capital analytics, but few banks have so far used these investments to optimize strategic business decisions.

This is perplexing, given the emphasis placed on cost/benefit analysis in other areas of bank investment - and represents a significant opportunity for industry leaders. Using economic capital and RAROC models to translate accurately measured risks into risk capital dollar costs is the only way to conduct true cost/benefit analyses for many important bank decisions.

As well as telling the bank which strategies are most worthwhile, economic capital-based analysis can also tell the bank how much of a risk-reducing strategy to implement - whether the strategy is a series of bank acquisitions to increase diversification or a risk transfer program.

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