The ideal partnership for risk management

This article is a shortened version of a presentation given at the joint seminar held on 29 January between the Association and the Institute & Faculty of Actuaries.

In February, Oceanus wrote an article in *The Treasurer* that asked if treasurers and actuaries formed the ideal partnership. At Prudential, they have been working together for many years and this article provides a case study of such a partnership addressing questions of risk and value management. The work in question was commissioned a few years ago by the chief executive and the finance director and, without doubt, would not have been successfully completed without both parties being involved.

It sounds simple to ask what is our capital and where is it? Where do we have surplus and where do we have deficit? What risks are we running, and are we really making appropriate returns for those risks? But within Prudential and the industry in general there are several ways of accounting for the business and none of them provide the cashflows or capital analysis we needed to answer these questions.

So we started from scratch and built a framework that linked capital, risk and value together. We started at the product level and built up, and then at the end of the day reconciled back to the equity market to check whether our results made sense. That enabled us to make transparent the economics of our business from the top level through the business level down to the product level.

Value framework

Shareholders are not really that interested in what the accountants tell them. Instead, they look through to the underlying economics of the business, what cashflows are going to arrive when, and that includes returns expected from sales that have not yet been made, which accountants are generally unable to incorporate.

Valuation basically needs two elements. First, what cashflows to shareholders are you expecting in the future and what is the full range of possible cashflows? Second, what interest rate should you use to discount those cash flows (that is, what is the cost of equity)?

FIGURE 1

The capital asset pricing model tells you that the cost of equity depends on the company's 'beta' or systematic risk (see *Figure 1*). Shareholders are not concerned with diversifiable risk – what matters is the extent to which returns from the firm are linked to returns from the market. Suppose the risk-free rate is 6% and the expected overall return from the equity market is 8%. Then the cost of equity is: 6% + ß x (8%-6%). So how do we actually estimate the risk? You cannot just look at what has happened in the past because companies change over time. Also, we are not interested just in the cost of equity for the company as a whole, but in how that might vary for different business units and for different products we might want to sell.

Stochastic modelling

Therefore, we need some kind of forward-looking measure. This is where stochastic modelling comes in. We can use that to understand the core drivers of the business and how they relate to the equity market. In other words, we consider a range of economic scenarios and within each of those we look at what the returns to the stock market would be and what the effect on our

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company would be. From this, we can estimate the required beta.

Economic balance sheet

Stochastic modelling is a powerful and flexible tool for addressing these questions. But here we will focus on one of the tools we used to present the results in a way we found was meaningful to the people we were talking to, the economic balance sheet. To illustrate the concept, we will use a purely hypothetical example of a simplified fund management business.

Consider first the P&L shown in *Table 1*. The firm has three types of income: initial charges on new business; annual charges on funds under management; and an additional performance-related fee if performance is good. All expenses are lumped together. To keep things simple, we ignore future growth so the figure shows the expected P&L in each future year. There is an expected net profit each year of £1.9m. If the company assumes its beta is 1, then using the figures earlier, the cost of equity is 8%. The present value of a profit stream of £1.9m a year in perpetuity can then be calculated to be £23.8m. But this calculation ignores risk. The balance sheet in *Table 2* shows the effect of risk on the value of each cashflow, with positive cashflows (assets) on one side and negative cashflows (liabilities) on the other. Many assumptions have been made in deriving the figures, namely:

- new business volumes are uncertain but are independent of equity market levels – hence the initial charges have a beta of 0;
- annual charges are a straight percentage of funds under management – hence have a beta of 1;
- performance is good when the market does well, giving a beta for the performance related fee of, say, two; and
- expenses increase with inflation, providing a weak link to equity returns – a beta of 0.2, say.

The riskiness of the cashflows has to balance on both sides. Hence, the shareholders (and the taxman) have to take the hit for whatever is left. They are the balancing item so far as risk is concerned. The calculations show that the implied beta for the shareholder profits is 3.7, and hence the risk-adjusted value of the business is only £14m, not the £23.8m derived above. We have found that the economic balance sheet is a convenient and intuitive way to express the results of the modelling to decision makers. They can see the numbers add up. We can also test simply changes to the business and their impact on the risks and the value of the business.

For example, suppose we look at the expense side and decide to have fewer salary outgoings that are fixed and more which are related to performance – which is the way many companies are trying to go. This pushes up the beta of the expenses and makes them more dependent on what is going on in the market. That actually brings down the discounted value of those expenses. Consequently, it makes the shareholder cashflow less risky and pushes up the value of the business to shareholders.

Capital requirements

We have linked the risk and the value items of the framework. The final element is the capital requirements. Again, the idea is to present results in a way in which management can relate to.

Clearly, you need capital to withstand downside risks. For a normal public bond that is rated AAA you accept a small chance of default or insolvency in any given year. We can look at the distribution of cashflows from the stochastic modelling and see how much capital we need in the business if we want it to look like a AAA-rated bond.

Management has an intuitive understanding of what credit ratings on bonds mean. So when we look at the range of uncertain outcomes of what the business will look like in the future, and at how much capital is needed in the business, we avoid talking about probabilities and talk instead about equivalent credit ratings on bonds.

Assessing the results

Next, we will discuss some of the outcomes of the modelling in generic terms. First, risk-adjusted cost of capital (see *Figure 2*). We were already using different discount rates for different businesses. But this work changed our views on what some of these should be. For example, consider a with-profits

TABLE 1

Profit and loss account

Initial charges (for example, 1% on £120m new business)	£1.2m
Annual charges (0.5% on £1.2bn funds under management, say)	£5.6m
Performance-related fee	£1.0m
Expenses	(£5.1m)
Gross profit	£2.7m
Tax (at 30%)	(£0.8m)
Net profit	£1.9m

TABLE 2

Economic balance sheet

Assets

	Beta	Discount rate	Value
Initial charges	0	6%	£20m
Annual charges	1	8%	£70m
Performance related fees	2	10%	£10m
Total assets	0.9	7.8%	£100m

Liabilities

	Beta	Discount rate	Value
Expenses	0.2	6.4%	£80m
Tax	3.7	13.4%	£6m
Shareholder	3.7	13.4%	£14m
Total liabilities	0.9	7.8%	£100m

policy or other type of insurance policy where the firm is giving guarantees or embedded options to the client ('Product A'). This transfers market risk from the client to the company, making it a higher risk for the owners of that business than the market. Our modelling challenged internal conventional thinking and led to much more significance being paid to those embedded options.

We then had some products ('Product B') and businesses where the discount rate we calculated was almost identical to the one we were using before. Here, we were able to demonstrate why this was the right rate to use. A particular example was our annuities business, where we were investing in bonds to match the annuity payments, so you would expect a low risk. Offsetting that is a high mortality risk, which needed to be taken into account. We had some businesses ('Product C'), such as our general insurance business selling household and motor insurance, where frankly we had been charging too high a discount rate. This work helped management focus on the opportunities available.

Next, capital (see *Figure 3*). We looked at three measures of capital:

- the capital tied up in the business, being the value of the cashflows going forward derived from the modelling (including capital invested);
- the amount of capital regulators (or other external audiences such as rating agencies) require us to hold; and
- the economic capital derived from the stochastic modelling and distribution analysis – how much capital we need to hold for a particular level of financial strength, in our case AAA.

A typical result for most of the businesses ('Business A') was that the value in the business, and the capital we had tied up, was higher than that required by the most demanding of our external regulators. However, usually what we really required was something less. For example, our general insurance business. This work allowed us to extract the surplus capital or find other ways to apply and use the capital within that business.

This was not true for all our businesses. In some ('Business B'), the value of the capital tied up in the business pretty much equated to our assessment of the capital. But the regulators required less. This does happen; the external regulators do not have the same detailed knowledge of the business as we have. An example might be banking regulation, which requires banks to hold the same amount of capital whether they are lending to a AAA company or a single B company. In such cases, we do not play the regulatory game as we know that one day those chickens may come home to roost, so we keep the same amount of economic capital we have in the business.

FIGURE 2

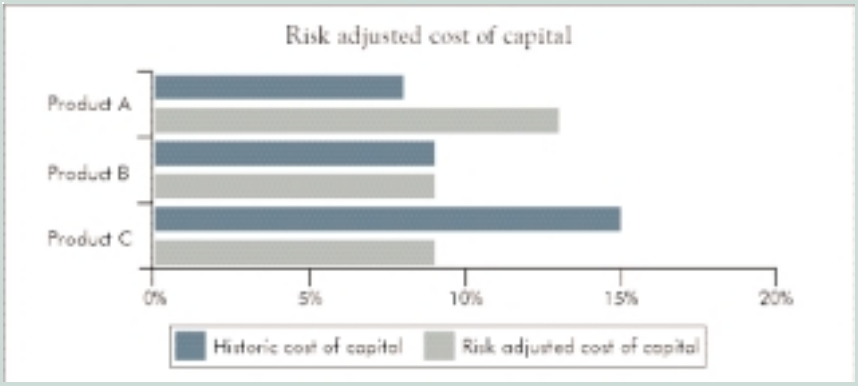
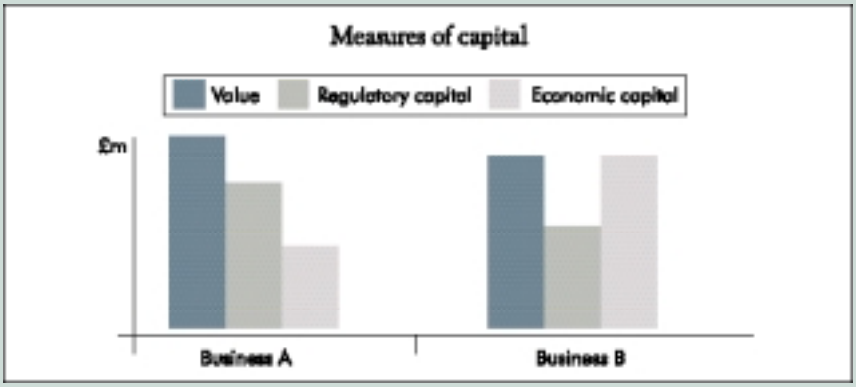


FIGURE 3



Leading to better things

The case study described here has helped lead to the adoption of value-based management at Prudential. It also led to development and implementation of a company-wide risk management framework.

Importantly, it gave capital management a seat at the table and led to an increased focus on capital efficiency and return on capital.

We discovered that actuaries who combine a real practical understanding of the capital markets are invaluable.

Second it is also not easy to get people to escape from the way they were taught and start with a blank piece of paper and think how a rational shareholder would behave. And third we found there is great suspicion about technicians. Both treasurers and actuaries have to ask, how do we get through to the board room (where time is limited) and deal with these complex issues?

The lessons learned are mostly about communication – doing things in an intuitive way. However, that is not enough. We also need to address the 'so what?' We spent as much time trying to get through to the insights and boil them down to simple messages as we did on the analysis itself. The application of a risk and capital framework such as this has to be extremely simple. Otherwise the benefits do not get out into the real world. ■

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