Capital: It's overrated!

A different perspective on the use of capital for steering purposes

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Presented to the
International Congress of Actuaries
Cape Town
8th March 2010

Ref. No.: 21
Track: Non-Life Insurance (ASTIN)

Abstract

Increasingly, capital seems to be at the heart of the financial management of a modern-day insurance company. Encouraged by regulators and rating agencies, firms are using their capital models and capital-based methodologies for a range of steering considerations. But risk-bearing capital mainly exists to protect *policyholders*!

This paper questions the prevailing capital-focussed steering culture, from a *shareholder* perspective. It homes in on pricing, risk-transfer and reserving applications. Suggestions for a more shareholder-focussed approach are offered.

Keywords

Capital-based steering; Diversification; Economic balance sheet;   Market cost of insurance risk; Market value margins;   Risk-bearing capital; Risk transfer; Shareholder value; Solvency II; Steering

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This paper is a revised and updated version of a paper by the same title, presented to the Staple Inn Actuarial Society (London, UK) in January 2009.

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1 Introduction

1.1 Increasingly, capital seems to be at the heart of the financial management of a modern-day insurance company. Ever more sophisticated calculations implemented by teams of highly qualified staff are used to determine the amount of "economic" capital required by their firms. Regulators and rating agencies too, are embracing these sophisticated approaches for the calculation of capital under their jurisdictions. Indeed, these two stakeholders emphasise the need to embed the economic-capital model in many aspects of the management of an insurance firm via the so-called "use test". One can, therefore, be forgiven for forming the impression that just as the proverbial army marches on its stomach, so too does an insurance firm's success march on matters capital.

1.2 Not without some degree of trepidation, this paper sets out to question the prevailing capital-focussed steering culture. The ascribed importance and centrality of capital in certain aspects of the management of an insurance firm is examined and challenged. We specifically focus on the perceived importance of capital in matters relating to pricing, risk-transfer and reserving (with an eye to Solvency II developments).

1.3 This is not to suggest that capital is unimportant! We do not question the importance and relevance of capital when determining a firm's risk-carrying capacity. What we do question, however, is its all pervading presence in so many aspects relating to the financial steering of insurance firms.

1.4 The remainder of this paper is structured as follows: In Section 2 we define what we mean by the term "capital" as used in this paper and observe that its primary purpose is to protect policyholders. We note the increasing pressure being exerted on firms by external policyholder-protection-focussed stakeholders to use their capital models for many aspects of financial steering, including aspects that are mainly of relevance to shareholders.

1.5 Section 3 commences by observing some paradoxes that seem to arise from a shareholder perspective, when a firm prices its products with a focus on return-on-capital considerations. It then moves on to examine whether the diversification benefit within a firm, which is a key factor in capital-focussed pricing approaches, is really as valuable to shareholders as is often claimed. (The Appendix, however, puts forward a few ideas of where diversified firms may be at an advantage, relative to less diversified firms.) Return-on-capital pricing approaches generally demand a uniform return on the capital allocated across a firm's portfolio, but we bring evidence to suggest that the "market" sets different return demands, even for risks or perils that might exhibit similar statistical qualities. The anatomy of a firm's economic value from a shareholder perspective is then discussed, before concluding with an overview of an alternative approach to product pricing that, we contend, is more shareholder-focussed than return-on-capital approaches.

1.6 It is not uncommon for a firm to assess potential risk-transfer transactions taking into account the impact that the transaction would have on its capital consumption and deemed costs thereon. In Section 4 we query whether such approaches are necessarily shareholder focussed, and suggest a different method for assessing such transactions, which could be regarded as being more shareholder friendly.

1.7 Solvency II is currently a hot topic and with its increased portfolio-specific risk sensitivity is generally regarded, quite justifiably, as being a significant improvement over the current Solvency I regime. Yet, the Solvency II capital requirement is based on a one-year risk measure. This means that a firm's technical provisions need to be adequate to support their transfer to a third-party, should the firm experience adverse event(s) that consume its entire Solvency II capital requirement over the one-year term of the risk measure. The specified approach to ensuring the adequacy of the technical provisions is to include "cost-of-capital" risk margins within the technical provisions. These cost-of-capital provisions are meant to provide a sufficient return on the capital that the third party is assumed to have to tie up as a result of the transfer. In Section 5 we examine whether this cost-of-capital approach is necessarily the appropriate bridge between the statistical world of the one-year risk measure and the shareholder-value considerations that would determine whether – and the price at which – a third-party might acquire a block of business from a severely distressed insurer.

1.8 In Section 6 we briefly note the importance of communication, both internally and externally, if a firm is successfully to adopt a more shareholder-friendly approach to steering than the currently popular capital-focussed approaches.

1.9 The focus of this paper is on so-called insurance risks, as opposed to market risks that may be embedded within insurance products. For the latter, the pre-eminence of own-capital and own-capital-cost considerations has generally given way to more market- and shareholder-focussed approaches.

1.10 Criticising is easy; suggesting improvements, less so! This paper certainly does not claim to have all the answers, but hopefully it does at least raise some of the questions.

1.11 Although this paper has mostly been written from a non-life perspective, the principles discussed may also be applied to life business.

1.12 Views expressed in this paper should be regarded as being my personal views and in particular, should not necessarily be regarded as being those of my employer. At the same time, however, I should acknowledge that my views have been influenced by vigorous discussion and debate with colleagues and by various papers and articles that have appeared over recent years, with the papers by Exley & Smith (2006) and Tillinghast (2005, 1) being amongst the first to cause me to question my then-held capital-centric views.

2 Capital – what do we mean by it?

2.1 RISK-BEARING CAPITAL PRIMARILY EXISTS FOR THE BENEFIT OF POLICYHOLDERS

2.1.1 There are many different definitions of capital, but in the context of this paper we are referring to financial resources, held within an insurance firm, that are available as risk-bearing funds to absorb adverse experience and hence to meet greater-than-expected policyholder claims.

2.1.2 Insurance is an industry based on promises – firms promise to meet the future claims of their policyholders in exchange for premiums paid in advance. In order for policyholders to attach any credibility to these claims-paying-ability promises of insurance companies, policyholders demand that their insurers hold risk-bearing capital as a buffer against adverse claims experience.

2.1.3 Policyholders ought not to be too fussed as to who sources this risk-bearing capital – be it shareholders or bondholders – provided the rights of these capital providers to draw dividends (or interest) and to demand the return of their capital are subordinate to policyholder rights.

2.1.4 Shareholders would prefer to put as little as possible risk-bearing capital into their firms, but without being able to demonstrate an adequate claims-paying ability or financial strength to their prospective customers (and to any existing customers who have relatively unimpeded and inexpensive exit opportunities), they will not be able to carry on insurance business. Shareholders are hence forced to capitalise their firms to the extent required by their target-market customers and the relative (to their competitors) level of premiums they wish to charge.

2.2 GUARDIANS OF POLICYHOLDER SECURITY

2.2.1 Several guardians of policyholders' financial-strength concerns exist, each potentially giving rise to a different quantum of required risk-bearing capital:

i. Regulators: Taking the European Union (EU) as an example, regulatory capital requirements have been in place for several decades now, with the initial requirements having been introduced in the 1970s. The original EU solvency regime was fairly risk-insensitive and the current incarnation of that regime, known as Solvency I (introduced in 2002) suffers from many of the shortcomings of its predecessor. However, the regulatory capital requirements will be changed fundamentally to a more risk-sensitive regime with the advent of Solvency II (expected to be implemented in 2012).

ii. Rating agencies: Rating agencies assess the claims-paying ability of insurance firms. The different agencies have various approaches for deciding upon the appropriate claims-paying-ability rating of a firm. These would normally include the specification of the quantum of risk-bearing capital necessary to support the desired (by the firm) rating level. Rating-agency models are also becoming increasingly risk-sensitive and economic, though it is probably fair to say that, at least for those agencies who have published their models in the past, their starting points are more advanced than is the current Solvency I regime.

iii. Management view: Leading firms have, over the past 5 to 10 years, expended considerable resources developing their own internal economic-capital models. These internal models portray a management view as to how much risk-bearing capital the firm believes it needs to hold in order to provide a specified level of security to its policyholders. These models were developed in response to perceived shortcomings in the regulatory and rating regimes as they existed at the time. Shortcomings specifically addressed by internal economic-capital models include improved own-portfolio risk-sensitivity, allowance for diversification between risk types in the portfolio and the valuation of assets and liabilities in a market-consistent fashion – hence the label "economic".

2.2.2 The regulatory and rating measures of risk-bearing capital requirements are converging towards an increasingly firm-specific, risk sensitive and economic approach. Indeed the leading rating agencies and EU regulators (under Solvency II) will, under certain circumstances (see Section 2.3) permit firms to calculate their respective capital requirements under these regimes using their internal models. However, the three capital measures are unlikely to converge to the same capital requirement. Many firms need to demonstrate a lower default probability to their clients than is required by regulators and consequently, they will be forced to set more onerous internal model and rating default-tolerances in order to compete. However, complete convergence of the internal-model requirements and the rating requirements is also unlikely as a result of diverging interests between the parties behind the respective capital regimes. For a given default probability, the externally-set rating-capital requirement will invariably exceed the internal-model capital requirement (see Bergman, 2008).

2.2.3 The key point to note however, is that all three of the above measures have the common objective of providing security to policyholders. The default tolerances associated with the respective risk-capital requirements of the three regimes all give an indication to policyholders of the likelihood of their not receiving the full benefits to which they are entitled, should their insurer suffer an extreme, adverse event (typically one that would only be expected to occur once in every two hundred years, or even less frequently).

2.2.4 Although perhaps obvious, it is worth emphasising that these three risk-capital measures tell us very little about the risk tolerance of the shareholders of the firm. Unlike policyholders, shareholders are not only concerned about their firm going bust i.e. about 1-in-200-year (or even more remote) events. It is this very fact that risk-bearing capital requirements reflect a policyholder perspective i.e. that they are a policyholder risk measure, that would seem to render capital-based approaches questionable for matters relating to shareholders and shareholder value. Risk-bearing capital held within a firm can be very different to the shareholder capital or market capitalisation of the firm (e.g. as a result of subordinated debt and/or franchise value); shareholders require a return on their total market capitalisation. Furthermore, risk-bearing capital consumption does not tell us anything about the returns that shareholders can reasonably demand for different risk-types or perils that the firm insures.

2.2.5 Finally, we would observe, that having established the minimum amount of risk-bearing capital necessary to satisfy existing and prospective policyholders, firms may elect to hold additional capital, be it for strategic purposes such as to fund prospective acquisitions or to protect the franchise value (see Section 3.4). Such surplus capital exists primarily for the benefit of shareholders, although it does also have the side effect of giving policyholders additional security.

2.3 THE USE TEST

2.3.1 Given the focus of risk-bearing capital on *policyholder* security, it is not surprising that regulators and rating agencies, as guardians of policyholder security, place so much emphasis on the so-called "use test" in their assessments as to whether a firm's internal model may be used to calculate the rating capital or regulatory capital (under Solvency II) requirements.

2.3.2 Article 118 of the Solvency II Directive (EU Commission, 2008) for example, requires firms wishing to use their internal models to calculate their Solvency Capital Requirement (SCR) in place of the standard formula, to demonstrate that their internal model "is widely used and plays an important role" in their governance systems, including risk-management systems, decision-making processes and, in their economic and solvency capital assessment and allocation processes.

2.3.3 The rating agency Standard & Poor's (S&P), in a discussion paper on its process to assess a firm's internal capital model (S&P, 2007) stressed the need for a firm to pass a "use test" in order for its model even to be considered for a review by S&P. Uses such as, amongst others, capital allocation, performance reporting and management incentive schemes based on such allocations and, reinsurance/securitisation optimisation were included amongst the list of expected uses of the economic-capital model.

2.3.4 Companies appear to be embracing, wholeheartedly, the spirit of the use test, which is perhaps not really surprising given the gravitas of the bodies that are behind this test! The 2006 Tillinghast ERM Survey (Tillinghast, 2006) identifies the key uses to which economic capital is put. Leading uses include capital allocation, measurement of risk-adjusted performance, strategic or tactical decision taking and product pricing.

2.3.5 In the later sections of this paper we question the appropriateness of some of the uses to which capital models and the capital requirements emanating from them are put. We focus, in particular, on matters relating to pricing, to risk-transfer decisions and to cost-of-capital margins in technical provisions.

2.4 IMPORTANCE OF HAVING A GOOD HANDLE ON POLICYHOLDER SECURITY

2.4.1 In this section we have emphasised the following:

i. Risk-bearing capital exists primarily to satisfy policyholder requirements that their insurer be financially strong enough to meet its contractual liabilities, even under extremely adverse conditions.

ii. Regulators in particular, but rating agencies too, as custodians of policyholder security, focus on an insurer's risk-bearing capital. Internal economic-capital models have a similar focus.

iii. In order to gain confidence in a firm's internal model, regulators and rating agencies stress the need for the firm to use its internal model for a range of steering activities (the "use test"), some of which are directly related to shareholder-value issues.

iv. Risk-bearing capital reflects the firm's policyholders' risk aversion, albeit as articulated by management, rating agencies or regulators. It tells us very little about the firm's shareholders' risk aversion, nor about the rewards that shareholders can reasonably demand for the different risk-types written by the firm.

2.4.2 But before leaving this section, it is worth emphasising that any implied criticisms of the uses to which economic capital and other capital models are put, are not in any way to be seen as a denigration of the importance of understanding and articulating the risk to which policyholders of a firm are exposed. It goes without saying that firms need to ensure that policyholders receive the benefits to which they are entitled (within the stated default tolerance) and that they are treated fairly. Rather, what this paper sets out to challenge are some of the uses to which risk-bearing capital and the models generating it are put, particularly when they relate to the more immediate interests of the firm's shareholders.

3 Capital-driven Pricing

3.1 BEGINNING TO DOUBT!

3.1.1 Capital appears to occupy a pivotal position when it comes to the pricing of many insurance products, with a firm's target price being very much influenced by the combination of return-on-capital requirements and the quantum of capital that has been allocated to the product (or business unit) in question.

3.1.2 Risk-capital allocation methods generally allocate more capital to a particular risk type, the greater the concentration of the risk type in the insurer's portfolio. Risks that worsen the degree of diversification are punished with a relatively heavier capital allocation. Consequently, a firm's target price for its peak risk-types will include a materially higher return-on-capital component than will its target price for its non-peak risk types, assuming that a uniform target return-on-capital rate is used (which will generally be the case, as the risk-capital allocated is, by definition, "risk adjusted"; as pointed out in paragraph 1.9, the focus of this paper is on what is generally referred to as "insurance risk").

3.1.3 Example: Company ABC insures a wide range of independent, but statistically similar, perils. All its policies are 1-year policies, each having a sum assured of €100 and an expected loss of €5. Amongst the firm's portfolio are perils X and Y. The firm is fairly heavily exposed to peril X but only lightly exposed to peril Y. It has calculated that, on average, each €100 cover under peril X requires €25 of risk-bearing capital, whereas each €100 cover under peril Y only requires €5 of capital. Accordingly, ignoring interest, expenses and tax, if Company ABC was looking to meet a 20% RoRAC target (i.e. return on risk-adjusted capital), it would need to charge €10 for each peril X cover, but only €6 for each peril Y cover (i.e. 5+20%x25 and 5+20%x5).

3.1.4 Suppose now, that Company BAC has an identical portfolio to its peer ABC, except that its exposures to perils X and Y are reversed. Assuming that each company targeted the same rate of return on capital for its shareholders and that the two companies assess the risks in the same way, then BAC would need to charge €6 for peril-X cover and €10 for peril-Y cover (compared to ABC's target prices of €10 and €6 respectively). Companies ABC and BAC would both no doubt argue that their focus was on delivering shareholder value and that their target prices reflected the cost of capital provided by their respective shareholders. This message does become rather difficult if the same shareholders own both companies! For the customers of ABC and BAC, however, the choice of insurer is straightforward!

3.1.5 The example above demonstrates that according to the capital-driven pricing approach, the amount of capital allocated to a product or risk-type can materially influence a firm's target price. There is, however, no unique method of allocating a firm's risk-bearing capital to its different risk types or business units. To explore the consequences of this, let us use our magic wand to make Company BAC disappear and replace it with Company ABC′. Company ABC′ is exactly the same as Company ABC in terms of its portfolio mix and RoRaC targets, except that it uses a different capital-allocation methodology and determines that it needs to sell its peril X cover at €9.50 per contract and its peril Y cover at €7 per contract (compared to the €10 and €6 respectively, of Company ABC). As in paragraph 3.1.4, the situation, whilst it lasts, is perplexing for a common shareholder (if not more so), but straightforward for customers (and leaves the product managers of peril X in Company ABC and peril Y in Company ABC′ with the distinct impression that life is just not fair!).

3.1.6 One of the objectives of a firm's determination of its target prices is to include a fair reward for the risks assumed by its shareholders i.e. a "risk premium". The examples above, however, lead one to ask the following questions:

i. Is it reasonable to argue that the risk premium demanded by shareholders for writing a like risk depends on the mix of risks in the legal entity writing that risk (as is implied by capital-driven pricing approaches)?

ii. Can it be the case that the reward required by a firm's shareholders for assuming a particular risk changes simply because management's method of capital allocation changes (again, as is implied by capital-driven pricing approaches)?

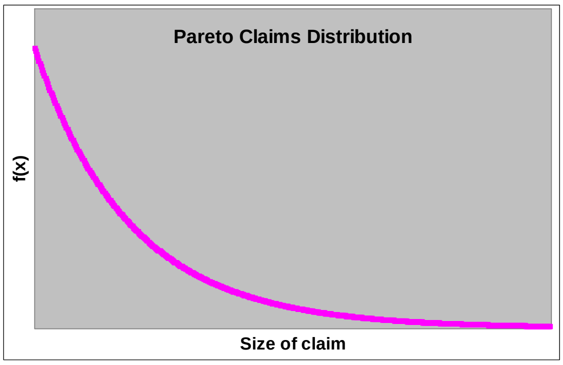
3.1.7 A $1 million loss on a Californian earthquake for example, is a $1 million loss to shareholders, irrespective of whether it arises in a diversified company or in an undiversified company, and irrespective of the methodology used by management to allocate capital to the risk! (But see also next paragraph.) From a shareholder perspective, the distribution of profits and losses from a particular risk does not depend on in which of his entities it has arisen, nor on how much capital has been allocated to the risk. Nobody suggests that the returns on a holding of 1000 Microsoft shares are any different if they are held in a balanced equity portfolio rather than in a standalone portfolio ..... not even if they are held by an insurance company! Nobody suggests that an equity-index Futures contract (low initial capital outlay by the investor) is an inherently better proposition to an investor than is an investment in the underlying shares themselves (high initial capital outlay by the investor)!

3.1.8 Paragraph 3.1.7 arguably, has echoes of the Modigliani-Miller theorem, which states that, subject to several simplifying assumptions, the market value of a firm is determined by its earning power and the risk of its underlying assets, but not by its degree of leverage. (In fact, as will be apparent later from Section 3.4 and in particular from the Economic Balance Sheet discussed therein, a loss of a given size could indeed ultimately have a different impact for shareholders, depending on any knock-on impacts on the firm e.g. the triggering of a situation of financial distress in one firm but not in the other. In that section, we also discuss other frictional costs to which shareholders of a firm are exposed and which, therefore, do need to be factored into product pricing and shareholder-value assessment.)

3.2 DIVERSIFICATION EFFECT: SHAREHOLDERS CAN LARGELY DO IT THEMSELVES!

3.2.1 Capital-driven pricing regards own-portfolio diversification as a significant competitive advantage. The argument goes that a fixed quantum of risk-bearing resources can be worked harder and more efficiently within a diversified insurance entity, thereby generating more underwriting profits per unit of capital and hence more attractive RoRACs and ROEs (return on equity) than were the entity to be undiversified. We now investigate whether having a diversified portfolio of insurance risks within an entity is necessarily as great a virtue from a shareholder point of view as is commonly claimed.

3.2.2 Suppose that an investor wishes to underwrite insurance risk. Having done his market research he has identified 10 potential customers each having identical but independent one-year risks. These customers would be willing to insure their risks via an insurance entity set up by the investor, provided that the insurance entity in question can demonstrate a suitably strong claims-paying ability, which we will take as a 1-in-1000 probability of default over the year. At the end of the year the company will be wound up (i.e. there is no franchise-value potential – we come back to the question of franchise value in Section 3.4). Our assumption that the risks are identical but independent is simply to keep the modelling simple. We also assume that claims under each contract follow a Pareto(34.3, 970.9) distribution (see inset figure), the two parameters having been chosen such that the mean claim is 1000 and the standard deviation is 30. Market testing has indicated that the potential customers would each be prepared to pay a premium of 1025.



3.2.3 The investor is considering how best to structure the risk-carrying vehicle(s) that he will set up for his endeavour. Two possible structures have been put to him (interest and expenses ignored):

i. Structure A: Ten separate mono-risk insurers would be set up, one for each customer, each capitalised to meet the customer's 1-in-1000-year default tolerance. The amount of risk-bearing capital that would be required in each legal entity in order to meet the customer's financial-strength requirement is P'(0.999) - 1025, where P'(0.999) is the 99.9th-centile claim according to a Pareto distribution with mean 1000 and standard deviation of 30. P'(0.999)=1187 and accordingly, the required capital per legal entity turns out to be 162 (i.e. 1187 - 1025). Given that ten identical entities would be established, the total amount of risk-bearing resources required would be 1620.

ii. Structure B: A single multi-risk (i.e. diversified) insurance entity that would insure all ten customers, would be established. The amount of risk-bearing capital that would be required in order to meet the customer financial-strength requirements is the 99.9th-centile claim according to a Pareto distribution having a mean of 10x1000 and a standard deviation of √10 x 30, less the premiums received = 10570 - 10 x 1025 = 320.

3.2.4 "Simple!", says the investor. "Why should I run 10 undiversified insurers requiring capital in aggregate of 1620 when I can bundle all risks into a diversified insurer and only have to inject 320 of capital? The diversified structure gives me an expected RoE (and even RoRAC in this case) of 78% i.e. 10 x (1025 - 1000) ÷ 320; the undiversified structure only offers an expected return of 15% i.e. 10 x (1025 - 1000) ÷ 1620".

3.2.5 A little further analysis however, suggests that, from a shareholder perspective, Structures A and B need not be as different as might first appear. Under Structure A, it is not essential that the investor pour in 1620 of equity capital to capitalise the ten standalone mono-risk companies. Instead, he could set up a holding company and finance it with 320 of his own capital (as he would have done under Structure B) and a third-party loan of 1300. These financial resources totalling 1620 would then be cascaded down as risk-bearing capital to each of the ten standalone insurance entities The loan has only a 1-in-1000 modelled probability of defaulting, whilst the expected loss to loan-capital providers represents even a smaller proportion of the total loan value – less than 1 basis point under our assumption of independent Pareto claims distributions, parameterised as above.

3.2.6 Figure 1 illustrates the alternative structures. Assuming the use of the same manager under both structures and that Structure A is set up so as not to be inefficient from a tax point of view (e.g. as is done in practice with Catastrophe (i.e. "Cat") Bonds or by domiciling the insurers in a low-tax jurisdiction), then there is not as wide a gulf between the two structures as far as the investor is concerned, compared to what might originally have been thought. True, under Structure A the investor (i.e. the "shareholder") is paying interest on the loan, which he is not having to do under Structure B. This interest, in essence, corresponds to his forfeiting of a good portion of his limited liability put option (LLPO – see Section 3.4), which he retains in full as a "gift" from his customers under Structure B. If the shareholder pays more than a "fair" rate of interest on the debt he raises (which would be evidenced if the fair market value of the debt at inception were to be greater than the amount of the loan itself), then additional shareholder value would be lost under Structure A relative to Structure B. In addition, Structure A will be somewhat more expensive from a structuring and ongoing administration perspective. On the other hand, Structure A offers the investor greater transparency and an increased ease and simplicity to spin off selected risks to third parties should he so wish, than is the case under Structure B. (Note that the nature of the default option is somewhat different under the two structures e.g. if Customer 1 produced a claim that exceeded his premium by 200 whilst all other customers produced claims equal to their premiums, then under Structure A, Customer 1's claim would not be fully satisfied – a shortfall of 38 – whilst under Structure B his claim would be met in full.)

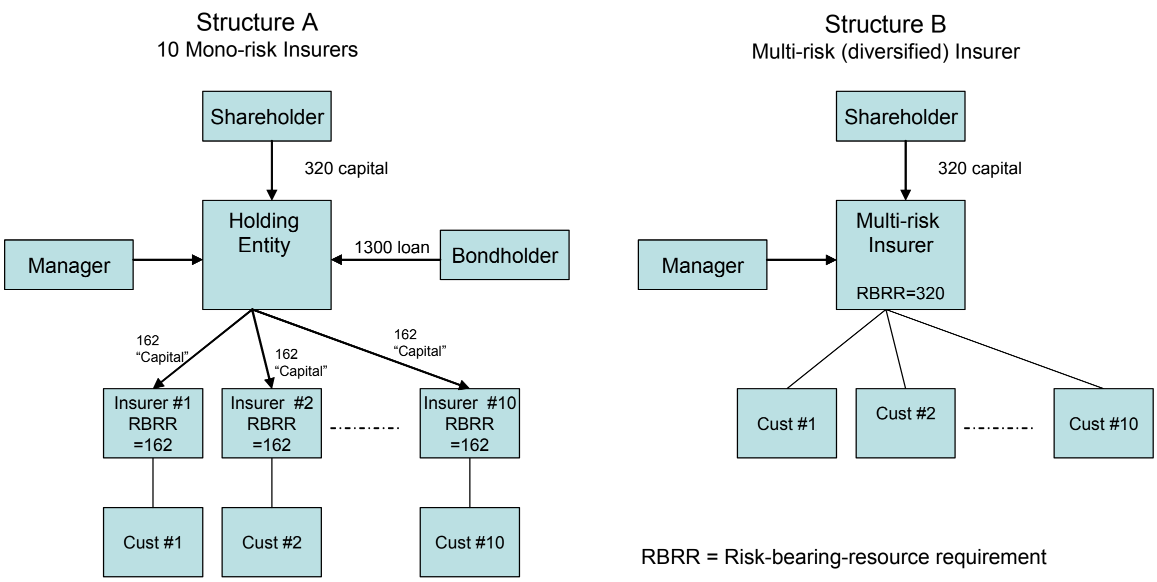


Figure 1. Shareholders can create their own diversification effect

3.2.7 Putting aside the specific detail of Structures A and B and the actual numbers used in our example, the message coming out of the above considerations is that diversification within a legal entity and the resultant impact on capital requirements per unit of risk written, should not materially impact the required risk-margin or reward for writing the risk, when pricing insurance contracts. Shareholders can largely create the diversification effect and benefit themselves. We see this happening in Cat Bond funds, which create a more diversified insurer out of individual, less diversified Cat Bonds or Insurance Linked Securities (ILSs). So too, the shareholders of the specialist longevity providers now active in the UK market, which are less well diversified than some of their longer-established competitors, no doubt diversify their longevity exposure further up their investment hierarchy.

3.2.8 Instead, the dominant risk-premium driver should be a "market-consistent" risk premium, albeit that this may need to be assessed subjectively (more on this in Section 3.5). Adopting such an approach would result in the respective legal entities under Structures A and B deriving similar target prices for like risks, in contrast to the results obtained from the more popular return-on-capital approaches.

3.2.9 The diversification example set out in Figure 1 and the assumptions around it, were specifically designed to focus on the question of whether or not the degree of diversification within a firm should influence the risk premium that it builds into its prices. We should not lose sight, however, of the fact that diversified entities can have advantages over undiversified entities in several respects. In particular, diversified entities may enjoy certain frictional-cost advantages over non-diversified firms. The Appendix, possibly best read after Section 3.4 by those who may be less familiar with the content of that section, contains a discussion on some of the shareholder advantages of diversification *within* an entity.

3.3 DIFFERENT PERILS/RISK-TYPES HAVE DIFFERENT ASSOCIATED MARKET RISK-PREMIA

3.3.1 Section 3.2 set out to demonstrate that the risk-premium deemed to be demanded by a firm's shareholders for taking on a particular risk should not be driven by the firm's own degree of diversification. This is in contrast to the results produced by capital-driven pricing methodologies, as illustrated in Section 3.1. In this section we introduce a further dimension, namely, that different insurance risks may have different associated risk-premia. (Questions relating to a firm's frictional costs will be picked up in Section 3.4.)

3.3.2 Figure 2, which shows average reinsurance prices charged during the January 2008 renewals as calculated by a major reinsurance broker, demonstrates that prices of different risk types or perils can differ materially. (Owing to the commercial sensitivity of these figures, the perils/regions have been anonymised.)

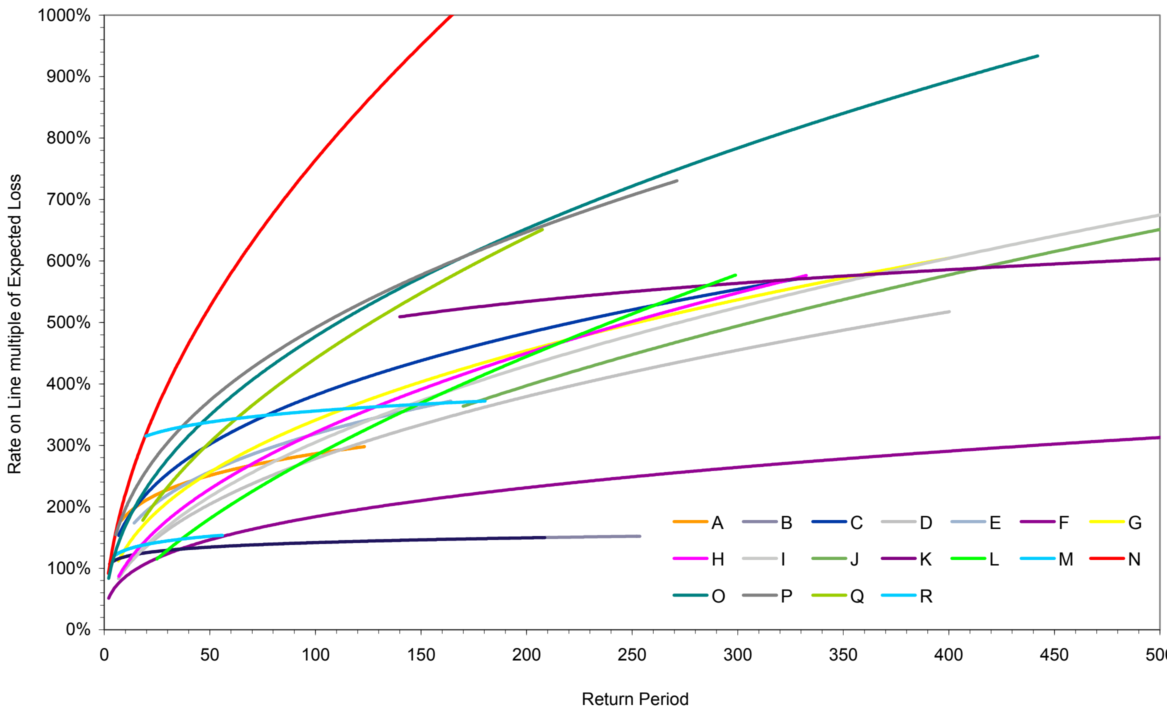


Figure 2. Average reinsurance-price charged during January 2008 renewals for a range of perils/regions (labelled A – R). Source: Aon Benfield. (Horizontal axis: Average number of years between loss occurrences of a certain size. Vertical axis: Ratio of premium to expected loss.)

3.3.3 Whilst the detailed information underlying that contained in Figure 2 may not be generally available, the ongoing development of the ILS market and, in particular, the transparency that it brings, will increasingly challenge own-portfolio capital-driven approaches to the pricing of insurance products. As can be seen in Figure 3, the prices of Cat Bonds for individual NatCat perils clearly differ, even if their statistical claims-costs distributions are assessed as being broadly similar. Figure 3 shows that for a given expected loss (horizontal axis), the market issue-price tends to be consistently higher for US perils (hurricane, Californian earthquake), followed by European Windstorm, Japanese perils (earthquake, typhoon) and finally, by earthquake perils in various miscellaneous areas e.g. Mexico, Australia.

3.3.4 *There would seem to be no way for a firm to capture these different risk-premia demanded by investors, using an own-portfolio capital-allocation approach together with a uniform return-on-capital assumption* (we will pick up this theme again when considering proposed reserving methodologies under Solvency II, in Section 5). Rather, from a shareholder point of view, the pricing of products should take market-implied risk-premia as a starting point (even though such risk premia need to be estimated). A firm that is happy to charge a lower risk-premium on the basis of the risk being a non-peak risk in its own portfolio, may add more shareholder value by advising its shareholders to take this exposure via a different legal entity that is charging a higher risk premium for the risk!

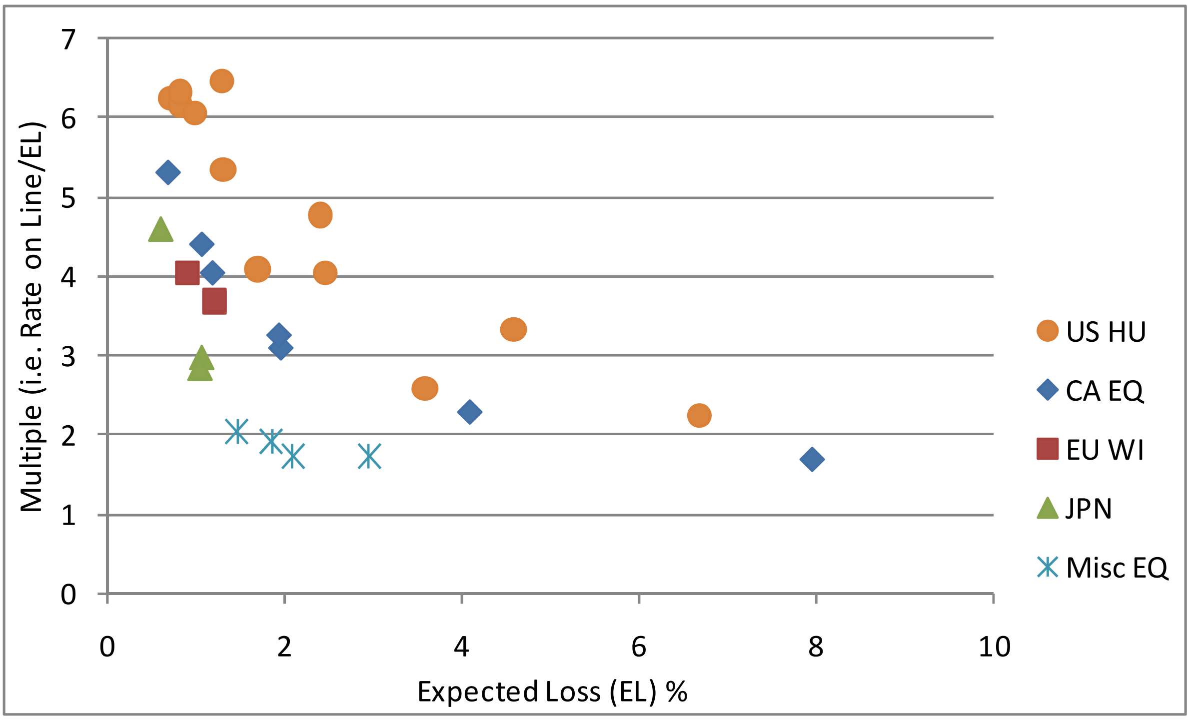


Figure 3. Single-peril Cat Bond issuances in 2007. Data source: Goldman Sachs

3.3.5 It is not uncommon for the management of an insurance company to derive a weighted-average cost-of-capital (WACC) from a combination of its cost-of-equity-capital and its cost-of-debt-capital. The equity-capital cost-of-capital may be derived from a CAPM analysis. If we ignore the complications introduced by the firm having a substantial franchise value component, what we find is that there could be a material disconnect between the required return obtained from the CAPM analysis and the shareholder required return on the insurance risks that the entity is writing. For example, if an insurer primarily writes NatCat insurance risks, a CAPM analysis should indicate that the insurer's returns (at least from its insurance business) are largely uncorrelated to the equity market, suggesting that virtually no additional reward for risk is required by the shareholders (i.e. zero "beta"). However, were management to price their products on this basis, they would be substantially short-changing their shareholders!

3.3.6 For whatever reason, investors do require a reward for taking insurance risk, despite the argument that it may be diversifiable – one only needs to look at the pricing of insurance-linked securities to confirm this. Not only do investors demand a reward for this so-called diversifying risk type, but the reward (i.e. the risk premium) that they demand differs depending on the general concentration of the different perils in the market. North American perils such as hurricane and earthquake have much larger investor-required risk-premia than do other NatCat perils (see Figure 3 above). In CAPM parlance, we could perhaps argue that they have a higher "NatCat beta". Pricing methodologies under which a risk premium is based on own-portfolio internal considerations will not pick up this feature.

3.3.7 Admittedly, it is not possible to directly back out a risk-premium from traded instruments for many insurance products. Even for those risk types that are traded, many argue that the market is insufficiently deep and liquid to provide a reliable risk-premium indication. However, if an own-portfolio capital-driven approach would not appear to work for the more liquid risks (i.e. it does not necessarily reproduce anything approaching market risk premia), is there any reason to assume that an internal approach is any more sound when the market in the underlying risk is even less liquid? Arguably not! Even for less liquid risks, one may do better by attempting to extrapolate a risk premium from similar risk-types that are more actively traded. In Section 3.5 we discuss briefly, the topic of estimating the market risk premium for (different types of) insurance risk.

3.3.8 As an aside, it is perhaps worth suggesting that external commentators such as analysts, need to recognise more explicitly that different risk-types do come along with different market risk-premia. Hence, even if two companies have portfolios having statistically identical characteristics (but with different constituent risk types), the currently popular performance yardsticks such as reported earnings and RoRaC, should be *expected* to produce different outcomes, owing to the different market risk-premia of the underlying risks.

3.4 OWN-PORTFOLIO RELEVANCE

3.4.1 In the earlier parts of Section 3, we argued that, from a shareholder perspective, a firm's degree of diversification and return-on-capital considerations, are not the appropriate starting point for product pricing. We have, however, at various times made certain simplifying assumptions, such as ignoring any frictional costs or franchise-value aspects. We now discuss whether there are, in fact, firm-specific considerations that may impact value-creation from a shareholder point of view.

3.4.2 For this purpose it can be very helpful to consider the firm's Economic Balance Sheet (EBS) as shown in Figure 4, which we have adapted from a similar depiction in Tillinghast (2005, 2). The EBS aspires to set out a *shareholder-focussed* valuation of the company. It attempts to explain (if only conceptually) the economic value of the firm (i.e. the market capitalisation) in terms of the various asset and liability items that build a truly economic balance sheet. The EBS should not to be confused with the economic capital commonly calculated by many firms (which is a key focus of rating agencies and Solvency II). As discussed in Section 2, such economic-capital measures are measures of available or required (as the case may be) risk-bearing resources, from the perspective of *policyholders*.

Assets		Liabilities	
MV of tangible assets	XXX	MV of "pure-play" insurance liabilities (MVL)	XXX
Limited-liability put option (LLPO)	XXX	MV of debt	XXX
Tax shields	XXX	Expenses - maintenance & investment	XXX
Brand value	XXX	Taxes incl. cost of double taxation	XXX
		Agency costs	XXX
		Costs of financial distress	XXX
			XXX
		Economic value ≈ Market Cap	XXX
	XXX		XXX

Figure 4. The Economic Balance Sheet concept.

3.4.3 A brief description of the various items on the EBS now follows, though we would point out that there is some degree of interdependence between several of the items and hence precise definitions can vary:

i. MV (i.e. market value) of tangible assets – is as the name implies, except to note that the more intransparent the firm's assets, the more likely are external investors to place a mark down on the actual market value of the assets (leading to a lower share price).

ii. Limited-liability put option (LLPO) – the value to shareholders of their ability to walk away from the firm if it goes well and truly bust (i.e. there is no requirement for shareholders to inject additional capital to fund policyholder losses). It is analogous to a put option on the firm. (As an aside, the global state-bailouts of distressed financial institutions, particularly during the second half of 2008, suggests that tax-payers may be able to make a reasonable case that shareholders of financial institutions transfer the value of their LLPO to tax-payers, perhaps by paying a premium to the state, based on the credit default swap (CDS) spreads of their institutions!

iii. Tax shields – the value to shareholders of the ability of the firm to pay less tax (e.g. through the issue of debt capital) or to defer tax payments (e.g. by setting conservative reserves).

iv. Brand value – the value that the market places on the firm's ability to write value-positive business in the future.

v. MV of "pure-play" insurance liabilities (MVL) – the "raw" market price of the risk excluding any firm-specific expense, tax, other frictional-cost and franchise-servicing considerations. *It does not depend on the entity carrying it!* Intransparent liabilities are likely to be marked up by the market, thereby depressing the value of the firm to shareholders. Of course, most insurance risks are not traded in a deep and liquid market. Section 3.5 discusses how one may go about estimating the MVL in such circumstances.

vi. MV of debt – as the name implies, the market value of the firm's debt.

vii. Expenses – maintenance & investment – the present value of the expenses the firm will incur in running off the in-force book (note that there is an interdependency with the expense assumptions used in the calculation of the "brand value" item).

viii. Taxes, including cost of double taxation – the present value of the taxes payable over the run-off of the in-force book. The "double taxation" aspect specifically refers to the fact that shareholders may suffer two bouts of tax on the risk-bearing capital that they have injected into the firm i.e. the firm will pay tax on the income earned on these net assets and shareholders may subsequently be taxed on the dividends that they receive. In addition, the volatility of a firm's taxable-profits will increase its expected tax burden, as tax relief on losses may be delayed or lost altogether. Further discussion is to be found in Section A3 of the Appendix. (As above, there is an interdependency here with the "brand value" item.)

ix. Agency costs – is the cost to shareholders arising from the fact that management do not always manage the firm in the best interests of shareholders (also known as the principal-agent dilemma). It is particularly driven by the amount of excess capital carried by the firm.

x. Cost of financial distress – is the amount by which the share price is marked down as a result of potential loss of brand value and the costs incurred in rectifying the situation, should the firm's financial strength slip below an acceptable level. The cost-of-financial-distress item can be reduced by holding excess capital, although this is likely to have an adverse impact on other items on the EBS, such as the costs of double taxation and agency costs. Further discussion on this item is to be found in Section A2 of the Appendix.

xi. Economic value – is the value of the firm to shareholders i.e. the market capitalisation.

3.4.4 Further description of many of the items on the EBS is to be found in Tillinghast (2005, 2). Note, however, that the item labelled "Brand value" in Figure 4 is labelled "Franchise Value" in the aforementioned reference. We prefer to define the Franchise Value as representing the full difference between the market capitalisation and the net assets, as do Exley & Smith (2006) i.e. Net Assets + Franchise Value = Economic Value.

3.4.5 An examination of the EBS presented in Figure 4 indicates that most of our preceding discussion on product pricing has focussed on the MVL item. The MVL can be viewed as consisting of an expected-loss component and a risk premium that is independent of the entity carrying the risk. The risk-premium component (see Section 3.5) is the reward for underwriting the risk in question, demanded by investors generally. It will vary over time as the market appetite for the risk changes. The risk premium is analogous to equity risk premia or to the spread over the expected loss that is to be found in corporate bonds. Management cannot really claim to have created shareholder *value* simply by harvesting the risk premia of the risks they are running, even though, post facto, they may generate profits and increase shareholder wealth. (We deliberately avoid questions such as whose expected-loss estimate should be used – the firm's own experts or an external agency?)

3.4.6 However, simply charging the MVL is not enough! The EBS shows that if a firm is to create value for its shareholders, the price that it charges for its products must not only cover the MVL and the firm's various acquisition and maintenance expenses, but it must also contain an additional margin such that the net effect on the firm's EBS is to increase the "economic value" item. (As an aside, this is an argument why the deliberate taking of market risk by an insurer is likely to destroy shareholder value. Assuming that the firm is only able to achieve market-consistent returns on such market risk, shareholder value will be destroyed as a result of a likely net adverse impact of the market risk on many of the items on the EBS i.e. the frictional costs. The favourable tax treatment of a particular asset class e.g. equities, in certain jurisdictions, could offset some of the adverse EBS impact.)

3.4.7 What may be an adequate price to charge for a risk in order to create shareholder value for one company, may be an inadequate price for another company. Much will depend on the impact of that risk on the various items on the EBS. Whilst competitive pressures may not permit a firm to charge its customers prices that are significantly out of line with the prices charged by its competitors, firm-specific considerations will certainly impact shareholder-value creation. So, for example, a diversified company with a substantial brand value may find that writing business at only a small margin over the MVL (plus origination and administrative expenses), will end up destroying shareholder value as a result of the additional risk that such business poses to the firm's brand value (i.e. increased financial-distress costs on the EBS). An efficiently structured special purpose carrier, on the other hand, may be a more appropriate vehicle through which to carry the risk, from a shareholder perspective.

3.4.8 Management's challenge is to strive to optimise (i.e. maximise) the firm's franchise value (as defined in paragraph 3.4.4) by pulling the various available levers that will impact the firm's EBS. These levers include, for example, a decision with respect to the amount of risk-bearing resources the firm should carry, the firm's debt-equity mix, expense levels and portfolio mix. Better and more transparent communication to investors may also have a liberating effect on the firm's economic value. This is a very different set of considerations to some of the more popular management and analyst targets such as hitting a certain level of accounting profits or clearing specific ROE or RoRaC hurdles. (We should observe that return-on-capital-driven pricing methodologies, to the extent that they load a relatively larger capital charge the larger the consumption of risk capital by the product, may be viewed by some as capturing several frictional aspects on the EBS that have a cost-of-capital flavour to them. In particular, this would apply to the "Taxes, including cost of double taxation" and the "Costs of financial distress" items. However, a one-size-fits-all RoRaC target e.g. of 12%, would appear to be too blunt an instrument to correctly price a product taking into account market risk-premia and the true impact of the risk on the firm's EBS.)

3.4.9 With the exception, possibly, of the market value of the tangible assets and of the firm's debt, most of the items on the EBS are fairly difficult to evaluate, to a greater or lesser extent (helpful ideas are to be found in Tillinghast (2005, 2), Exley & Smith (2006) and in Almeida & Philippon (2007)). However, an attempt can and should be made by management to create a model of the firm's EBS and then to run the business so as to strive to optimise the firm's franchise value. Clear communication by management of the thinking behind their strategic direction and actions should help shareholders to better evaluate management's performance.

3.4.10 Finally, we would note that in Phase II of its insurance-contracts project, the International Accounting Standards Board (IASB) is striving to reflect insurance obligations in a more shareholder friendly manner than under current reporting. However, even under Phase II, it would seem that a number of key items on the EBS are not being considered, thereby limiting the likely usefulness of the accounts in portraying a complete picture from shareholder point of view.

3.5 ESTIMATING THE MARKET COST OF INSURANCE RISK

3.5.1 In paragraphs 3.4.3(v) and 3.4.5 we introduced the concept of the "pure-play" or "raw" market-perspective price of insurance risk. As was then mentioned, and as will be discussed further in Section 3.6, this forms a key building block of a possible shareholder-focussed pricing framework. In the absence of a deep and liquid market in insurance risks, how can one go about obtaining an estimate of the market price of a particular insurance risk?

3.5.2 The problem of illiquid markets is not limited to actuaries! In 2006, the US Financial Accounting Standards Board (FASB) issued Statement of Financial Accounting Standards No. 157 (FAS157) on the subject of fair-value measurement (FASB, 2006). FAS157 deals with the setting of fair values for assets and liabilities under a wide spectrum of circumstances, ranging from (a) instances where quoted prices in active markets exist ("Level 1 inputs") to (b) cases where market prices for *similar* instruments only, exist ("Level 2 inputs") and finally to (c) instances where the firm has to estimate a fair value based on unobservable information ("Level 3 inputs").

3.5.3 FAS157 emphasises that fair value is a market-based measurement, not an entity-specific measurement and that consequently, the fair value of an asset or liability should be determined based on the assumptions that market participants would use. Even in situations where there is little market activity, the aim of fair-value measurement is to derive an orderly market price between the buyer and seller.

3.5.4 A more recent FASB publication, FAS 157-3 (FASB, 2008), gave guidance regarding the application of FAS157 with respect to the calculation of the fair value of a financial asset in an inactive market (the example focussed on a collateralised debt obligation i.e. a CDO). The procedure broadly involves the adjustment of available market information to take account of estimated changes in market-demanded risk premia since the time of the last available market information. Subsequently, FAS 157-4 (FASB, 2009) gave further guidance as to how to apply fair-value principles to assets and liabilities whose activity levels had decreased significantly.

3.5.5 In a recent amendment to IFRS7, the IASB instituted a hierarchical fair-value framework very closely based on the FASB's principles (IASB, 2009). (IFRS7 itself deals with disclosures surrounding Financial Instruments.)

3.5.6 This market-focussed, non entity-specific perspective appears to be very much consistent with the MVL as we have defined it above. Figure 3, which shows spreads at issue for a number of Cat Bonds issued in 2007, testifies to the fact that various snippets of market-pricing information are available. Furthermore, trading in the ILS secondary markets would provide further market-pricing signals for insurance risk.

3.5.7 Cat Bonds (and ILSs more generally) would seem to provide a good *starting* point for the derivation of the pure-play price of insurance risk (putting aside temporary ILS structuring shortcomings that came to light in the wake of the Lehman's bankruptcy in September 2008 – see Lane & Beckwith, 2008). They are issued in a transparent manner and have minimal associated frictional costs on their economic balance sheets (not to be confused with the sponsor-related issue costs), which means that the spreads that they pay their investors may well be a good indication of the market-demanded premium for the risk in question. Whilst the ILS markets may not be deep and liquid enough to provide "Level 1"-grade pricing indications even for the perils traded in these markets, "Level 2"-grade information could probably be obtained. As the specific insurance risk to be priced increasingly differs from the risks for which Cat Bonds and ILSs have already been issued, so greater reliance on unobservable (i.e. "Level 3"-grade) inputs will be required. These differences from traded instruments would include allowances for increased intransparency (e.g. for indemnity-based protection), different risk-types and different risk-periods etc. Yes of course, there will be an element of subjectivity in these prices, but at least they aim to produce fair market valuations, which, as the market becomes more liquid in the risk type in question, will home in on more objective prices. By contrast, prices obtained from internal, capital-focussed, pricing methodologies will generally exhibit a step change in direction should a switch to market-focussed pricing occur e.g. should the market in a risk-type become more liquid.

3.5.8 Some may argue that it is inappropriate to derive the pure-play price of insurance risk starting at the Cat Bond market, as it still represents a niche market compared to the much bigger traditional insurance and reinsurance markets. Aside from the implication that arbitrage opportunities would then appear to exist between the two markets, it would mean that some method of backing out a market-focussed pure-play cost-of-risk from (re)insurance pricing information would be required. This will probably prove more challenging, as it will be necessary to strip out expense loads, frictional cost and franchise-servicing elements from quoted insurance prices, all of which will tend to differ between insurers.

3.6 A POSSIBLE SHAREHOLDER-FOCUSSED PRICING APPROACH

3.6.1 Section 3 has attempted to demonstrate that the central role played by capital in the pricing of insurance products may be problematic. In particular, we have suggested that:

i. Return-on-capital-driven pricing is an introspective approach that yields prices that are not necessarily aligned with the reward for the risk in question demanded by shareholders more generally.

ii. Capital-driven-pricing approaches over emphasise the benefits of internal diversification, implicitly ignoring the fact that investors can create much of this benefit themselves in their broader portfolio of investments.

iii. Capital-driven pricing does not focus on the optimisation of the key component of shareholder value that is of interest to investors, namely, the firm's franchise value.

3.6.2 To address the above shortcomings, a different approach to the pricing of insurance products would appear to be warranted. One such conceptual approach might be as depicted in Figure 5. Under this approach, the minimum viable price at which a firm could sell a product would start with an estimate of the pure-play price of the risk in question, consisting of the expected loss and an inferred or estimated market-consistent risk premium for that risk. To this would be added the firm's relevant expense loads and an estimate of the impact of the risk on the other items of the firm's EBS. The resultant "production cost" from the perspective of the shareholders of the firm, is the zero-value-creation price. It would be compared with the price that the firm believes that it can actually achieve in the market. If the achievable price is higher than the firm's target price then the firm is in business! If not, the firm may do better for its shareholders by refraining from writing the risk, or by addressing its expense levels and/or its capital structure (to reduce any EBS drag) such that it can become genuinely competitive in the risk concerned.

3.6.3 If management feel that current market-inferred risk premia are unattractive, they would be free to avoid writing such risks on behalf of their shareholders, even if they are able to write the risk in question at or above production cost.

3.6.4 The entire process is likely to be of an iterative nature, aiming to optimise shareholder-value creation (i.e. franchise-value maximisation) relative to *all* the constraints faced by the firm. The firm's available risk-bearing financial resources at any point in time, is one such constraint. This optimisation process is best done on a portfolio basis rather than on a marginal basis. Although the process is not straightforward and will involve a number of subjective assessments, arguably it is at least heading in a more economically sound direction than does the apparently accurate return-on-capital-driven approach to pricing.

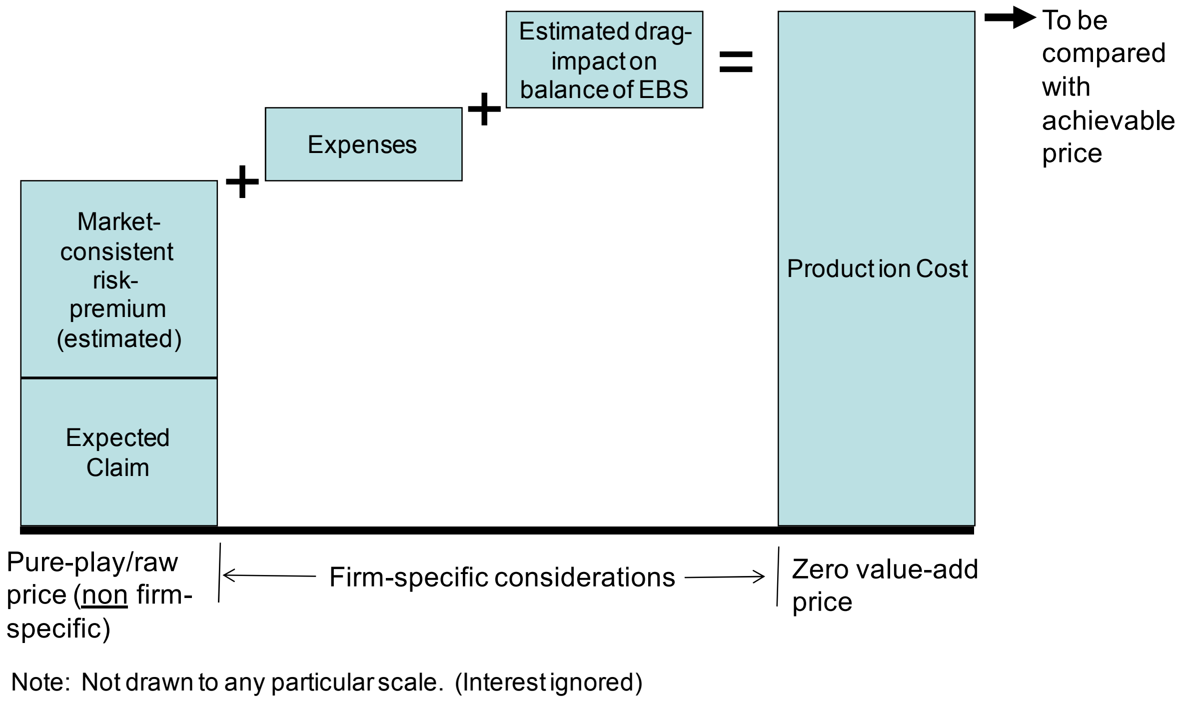


Figure 5. A shareholder-focussed approach to pricing

4 Opportunistic Risk-Transfer Evaluation

4.1 Risk-transfer drivers

4.1.1 Insurance companies commonly turn to third parties to lay off some of the risk they have assumed. Such risk-transfer usually takes the form of reinsurance (or retrocession) whereby business is ceded to other "regular" (re)insurance firms. Increasingly, alternative risk-transfer mechanisms are also being used. Examples include the use of "side-cars", risk-swaps between insurers, and Cat Bond and other ILS issuances directly to the capital markets (referred to as securitisations). Of course, quoted "regular" (re)insurers are also part of the capital markets, but generally do not offer their shareholders the transparency that ILS investors enjoy.

4.1.2 Firms may make use of risk-transfer mechanisms for a variety of reasons. These include, bringing a product to market that they would not otherwise have been able to do (for this, reinsurance would usually be used) and the recycling of capacity in cases where they would otherwise have hit a capacity constraint, be it capital-, concentration-, earnings volatility- or liquidity-related, etc.

4.1.3 In this section however, we shall focus on instances where risk-transfer is being considered purely for opportunistic i.e. non-essential reasons. This is the situation where a firm has no need to transfer risk that it is already running – no capacity constraints, no need for product-development assistance – it could quite happily retain the risk that is on its books.

4.1.4 The aim of opportunistic risk-transfer is invariably to create additional value for shareholders. How should management evaluate whether a prospective deal does indeed achieve this?

4.2 A capital-focussed approach

4.2.1 A popular method for evaluating prospective risk-transfer deals of this nature involves capital-related considerations. See, for example, Pollack (2005). Under this methodology, a firm may conclude that an opportunistic deal is attractive if:

Premium charged by third party < Expected recoveries from third party (net of the 3rd-party credit risk)
+ [capital relief obtained from the risk transfer x cost-of-capital%]
- Transfer expenses (e.g. commissions and fees).
.... 4A

4.2.2 The second term on the right hand side of inequality 4A is the most challenging to evaluate. On what basis should the capital relief be determined – regulatory, rating or internal-model capital? And what if the capital freed-up is retained within the firm? What cost-of-capital% should be used – something based on the company's Beta or WACC (weighted average cost-of-capital), perhaps management's targeted return-on-capital or maybe even a Solvency II-style cost-of-capital (see Section 5)? These are not simple questions to answer and the imagery of "square pegs and round holes" springs to mind! Doubtless, companies who have adopted this assessment approach will have found solutions to these questions (as did this author, once upon a time!).

4.2.3 According to this capital-focussed approach, a "win-win" situation arises when an undiversified insurer cedes business to a relatively more diversified insurer. The argument goes that, as the undiversified player will free up more capital through the risk transfer than the incremental capital that the ceded risk will consume when carried by the diversified player, value can be created for both parties (we assume that the two parties assess the risk similarly). The logic becomes a little trickier when a relatively well diversified insurer secures some of its risk i.e. when it cedes risk to the most undiversified and capital-intensive of all (re)insurers, namely the fully collateralised SPVs (special purpose vehicles) that issue Cat Bonds (but see also paragraph 4.3.17).

4.3 A SHAREHOLDER-FOCUSSED APPROACH

4.3.1 Whilst the above capital-focussed approach to the assessment of risk-transfer transactions may, at first sight, appear attractive and generally easy to implement (aside from the complications raised in paragraph 4.2.2), it suffers from the same shortcomings already discussed in Section 3 when examining capital-driven pricing, namely:

i. Failure to recognise that different risk types may be associated with different market risk-premia, which cannot be replicated based on own-portfolio diversification and capital considerations in conjunction with a single cost-of-capital rate.

ii. Driving shareholder-value decisions solely by attempting to maximise return relative to a policyholder-risk constraint (i.e. capital), rather than optimising shareholder-value creation (i.e. franchise value) by considering the full economic balance sheet of the firm.

4.3.2 In order to argue that one has genuinely created value for *shareholders*, a more shareholder-value-focussed approach would seem to be needed. Such an approach would give a "cede" signal if, for a prospective deal, the following inequality holds:

Premium charged by third party < Cost-of-retention
- Transfer expenses (e.g. commissions and fees).
.... 4B

4.3.3 The critical term in inequality 4B is the "cost-of-retention" of the risk within the firm. By this is meant the marginal costs to the firm's *shareholders* of retaining the risk to be ceded on the firm's balance sheet i.e. the cost to shareholders of continuing to "produce" the risk in question within the firm.

4.3.4 In order to evaluate the impact of the proposed transfer, including the "cost of retention", it is helpful to head back to the Economic Balance Sheet (EBS) as presented in Figure 4 above (reproduced here for readers' convenience).

Assets		Liabilities	
MV of tangible assets	XXX	MV of “pure-play” insurance liabilities (MVL)	XXX
Limited-liability put option (LLPO)	XXX	MV of debt	XXX
Tax shields	XXX	Expenses - maintenance & investment	XXX
Brand value	XXX	Taxes incl. cost of double taxation	XXX
		Agency costs	XXX
		Costs of financial distress	XXX
			XXX
		Economic value ≈ Market Cap	XXX
	XXX		XXX

Figure 4 (repeated). The Economic Balance Sheet concept.

4.3.5 The premium that the third party will charge, together with the various direct costs such as commissions and fees associated with the transfer (i.e. the first and last terms of inequality 4B), will clearly serve to reduce the “market value of tangible assets” item on the EBS. An assessment then needs to be made as to the impact that the transfer would have on all the remaining items on the EBS, in order to estimate the “cost-of-retention” from a shareholder perspective.

4.3.6 A comprehensive discussion of this topic is beyond the scope of this paper, but a brief overview of some of the considerations involved may be of interest. (The reader is also referred to the comments made in paragraph 3.4.9 and to the references quoted therein.)

4.3.7 One of the more significant constituents of the “cost of retention” is likely to be the market value of the “pure-play” liabilities in question or MVL (refer to Figure 4). As discussed in paragraph 3.4.3(v), this should represent the value that capital-market participants – including the firm’s own shareholders – would place on the risk being transferred. Critically, *it does not depend on the entity carrying the risk*. For risks that are not traded in a deep and liquid market, the firm’s experts will have to make a subjective assessment of the MVL, using whatever snippets of information and pricing signals emanating from the market are available, as discussed in Section 3.5. Note too, that the MVL does not depend on the price originally charged by the firm on its inwards business. As far as that is concerned, the reward has been harvested or the damage already done!

4.3.8 It is important that the MVL be based on the pure-play price of the exact risk that the firm plans to cede, which may differ from the risk that the firm actually has in its portfolio. For example, if a firm plans to “transfer” risk via the issue of a parametrically triggered Cat Bond, then the relevant MVL would be that for the risk actually covered by the Cat Bond. As an aside, in such a case, it would seem that the MVL would be more or less the Cat Bond price itself (i.e. the spread over Libor), unless the firm believes that the market did not charge a fair price. The latter may be a difficult judgement for the firm to defend, given all the transparency involved in its issue and particularly if the Cat Bond itself initially trades at around par in the secondary market!

4.3.9 Where a firm is transferring risk on an indemnity basis, the MVL will be higher than a corresponding transfer on a parametric basis (all other things being equal), owing to the intransparency and relative illiquidity of the risk in question from a market perspective.

4.3.10 Where a risk is to be transferred in such a way that it is subject to counterparty credit risk, the MVL needs to reflect the market-consistent price of that credit risk i.e. the MVL will be lower than for a comparable zero-credit-risk risk transfer.

4.3.11 The impact of the potential risk transfer on the other items on the EBS that feed into the "cost-of-retention" in inequality 4B, including the various frictional-cost items are, by contrast to the MVL, *firm specific*. To estimate these, it will also be necessary to calculate the impact of the risk-transfer transaction on the firm's excess risk-bearing capital position, net of any share buybacks done as a consequence of the risk transfer. (The excess-capital situation should be assessed relative to the tightest of the different risk-bearing capital regimes to which the firm is subject – see Section 2.2.)

4.3.12 By way of example, an increase in financial strength (i.e. in excess capital) as a result of the transaction, will have the following directional effects on the remaining EBS items and hence on shareholder value:

<u>Positive Impacts</u>
Brand Value – increased financial strength may support higher premium demands by the firm and/or increased new business volumes.
Costs of financial distress – will reduce as a result of the lower probability of the firm failing to meet its risk-bearing capital requirements.

<u>Negative Impacts</u>
LLPO – will reduce as the firm now has less chance of going bankrupt.
MV of debt – debt value will rise as the firm is less likely to default on its debt.
Agency costs – the additional excess capital will increase the agency-costs drag.

<u>Unchanged</u>
Tax shields – largely unchanged as the firm's outstanding debt position is assumed to remain constant.
Expenses – maintenance & investment – the amount of administration on the inwards portfolio will not reduce, as the firm does not normally transfer the administration of the liabilities in question to the third party (i.e. client correspondence, valuation and reporting will still have to be undertaken by the firm itself). If anything, the administration of the risk-transfer arrangements will push up total expenses incurred. Volume-related investment expenses might reduce slightly.

<u>Depends</u>
Taxes including cost of double taxation – if shareholder risk-bearing capital decreases, double taxation costs will decrease thereby increasing the firm's economic value and vice versa. (Note that an increase in *excess* risk-bearing capital does not necessarily mean that the total amount of risk-bearing capital sourced by shareholders has increased. It could also arise because the required capital has reduced by more than has the available capital.) The risk-transfer is, however, likely to make the firm's overall taxable profits less volatile, which in and of itself will reduce the costs of delayed or expired recoveries of taxable losses.

4.3.13 For a reasonably well diversified company, a modest amount of risk transfer will have almost no impact on these frictional-cost items and hence whether or not to proceed with a particular transaction will largely simplify down to whether:

Premium charged by third party < MVL - Transfer expenses. 4C

4.3.14 Based on our observation in paragraph 4.3.8, it would seem to be challenging for a diversified firm to create value via opportunistic risk-transfer transactions taking the form of securitisations, as this would require the Cat Bond investors to charge a price sufficiently below a fair market price, to enable the firm to overcome the drag effect of the transfer expenses (and this seems difficult to envisage). If at all, naive or cheap prices are more likely to be offered by the more traditional (re)insurance players who are not currently subject to the same degree of market scrutiny of the prices that they set.

4.3.15 For an undiversified firm on the other hand, a well designed risk-transfer program could have a sufficiently beneficial impact on the firm's various frictional-cost items on its EBS – in particular the "costs of financial distress" and "taxes incl. cost of double taxation" items (see the Appendix) – to overcome any transfer-expenses hurdle. Such a firm could transfer its risks to either a diversified reinsurer for whom the impact on its own financial-distress and tax-frictions items would be negligible, or via a securitisation, as by definition, the SPV involved will not have a financial distress item on its EBS as it has no brand value.

4.3.16 The reader may have observed that the approach that we are advocating for the assessment of potential risk-transfer transactions closely parallels the approach that we suggested for the pricing of inwards business as described Section 3.6. Only by adopting a consistent market-based approach from the front door through the house and out the back door can the firm have a coherent story with which to persuade its shareholders that it is genuinely focussed on building shareholder value. As proposed in paragraph 3.4.9, management should attempt to develop a model of their firm's EBS in order to facilitate a consistent assessment of all financial-steering decisions.

4.3.17 One last point before concluding this section: We mentioned in paragraph 4.1.2 that there are a variety of reasons why firms may consider transferring risk. This section has focussed on opportunistic i.e. non-essential risk transfer and has attempted to outline a shareholder-focussed assessment framework. Where a firm is considering risk transfer for other reasons, such as recycling its capacity, a different assessment approach may be necessary, quite possibly leading to a higher acceptable price of risk transfer. This may, in fact, be an explanation for the paradox noted at the end of paragraph 4.2.3 i.e. diversified firms ceding risk to undiversified structures.

5 Capital-based Reserving under Solvency II

Solvency II, the forthcoming solvency standard in the European Union, is currently a rapidly evolving topic. This Section has attempted to reflect developments to the end of August 2009. Subsequent developments to November 2009 are flagged via endnotes that are to be found after the Appendix.

5.1 SOLVENCY II – ONE-YEAR RISK MEASURE PLUS MARKET VALUE MARGINS

5.1.1 In the "old" regulatory world of Solvency I, not only are the technical *provisions* themselves set so as to be "prudent", but an additional amount of solvency *capital* is required in order to add a further layer of security from a policyholder perspective. As has already been pointed out in paragraph 2.2.1(i), the EU solvency margin that is required on top of the reserves is fairly risk-insensitive.

5.1.2 The net result of the Solvency I approach to reserving and solvency is that a company is expected to have enough "fat" (i.e. excess financial resources over and above its best-estimate of the cost of discharging its liabilities) to offer a degree of security to policyholders, over the entire run-off of the portfolio. However, there is no attempt to specify or quantify a firm's implied default probability, nor to have a clear demarcation between the firm's technical provisions, excluding margins for prudence, and the additional financial resources that offer further security to policyholders.

5.1.3 Solvency II will change much of this. Solvency II specifies an explicit maximum (modelled) default probability. It requires firms to be sufficiently capitalised such that the modelled probability of defaulting on policyholder liabilities over a one-year horizon is no more than ½%. Furthermore, there seems to be a clear desire to concentrate all of a firm's margins for prudence and adversity within its solvency capital requirement (SCR) rather than in the technical provisions, although these technical provisions will contain a "risk margin". (The practical challenges of robustly modelling a 1-in-200-year default probability are outside the scope of this paper.)

5.1.4 The proposed risk-measure under Solvency II is thus a one-year measure. Firms will be required to cover the requisite SCR with, at least, a corresponding amount of admissible financial resources, known as eligible own funds.

5.1.5 There is, however, a complication. Most firms' in-force obligations extend for terms of more than one year, often substantially so. A bridge therefore needs to be built between the proposed one-year solvency risk-measure and the fact that the firm's in-force risk extends beyond the timeframe of the risk-measure.

5.1.6 The form of bridge adopted by the Solvency II framework, with respect to non-hedgeable risks, is to supplement the best-estimate liabilities (BELs) with additional risk margins, known as market value margins (MVMs). The interaction between the SCR and the MVMs is perhaps more easily explained as envisaged prior to the publication of the Solvency II framework directive itself (EU Commission, 2008[i]), which is what we initially do below.

5.1.7 The thinking behind the one-year risk measure together with the MVMs in the technical provisions is that, assuming a firm is capitalised exactly to the SCR level, then this capital, together with its opening technical provisions, should be sufficient to finance the transfer of its liabilities to a third party at the end of the one-year horizon of the risk-measure, following adverse events during the year that consume an amount of financial resources exactly equal its total SCR.

5.1.8 The consumption of the firm's SCR pursuant to the adverse events mentioned in the preceding paragraph, could result from either, or a combination of, (i) increased claims incurred during the course of the year and (ii) an increase in the year-end BELs and associated MVMs as a result of changes to future-experience expectations that occur during the one-year period covered by the risk measure.

5.1.9 Figure 6 graphically illustrates this concept in a very simplified way. The company involved is assumed to be capitalised precisely to the SCR level at the start of the year (t=0) and is then assumed to suffer a 1-in-200-year loss exactly, over the year.

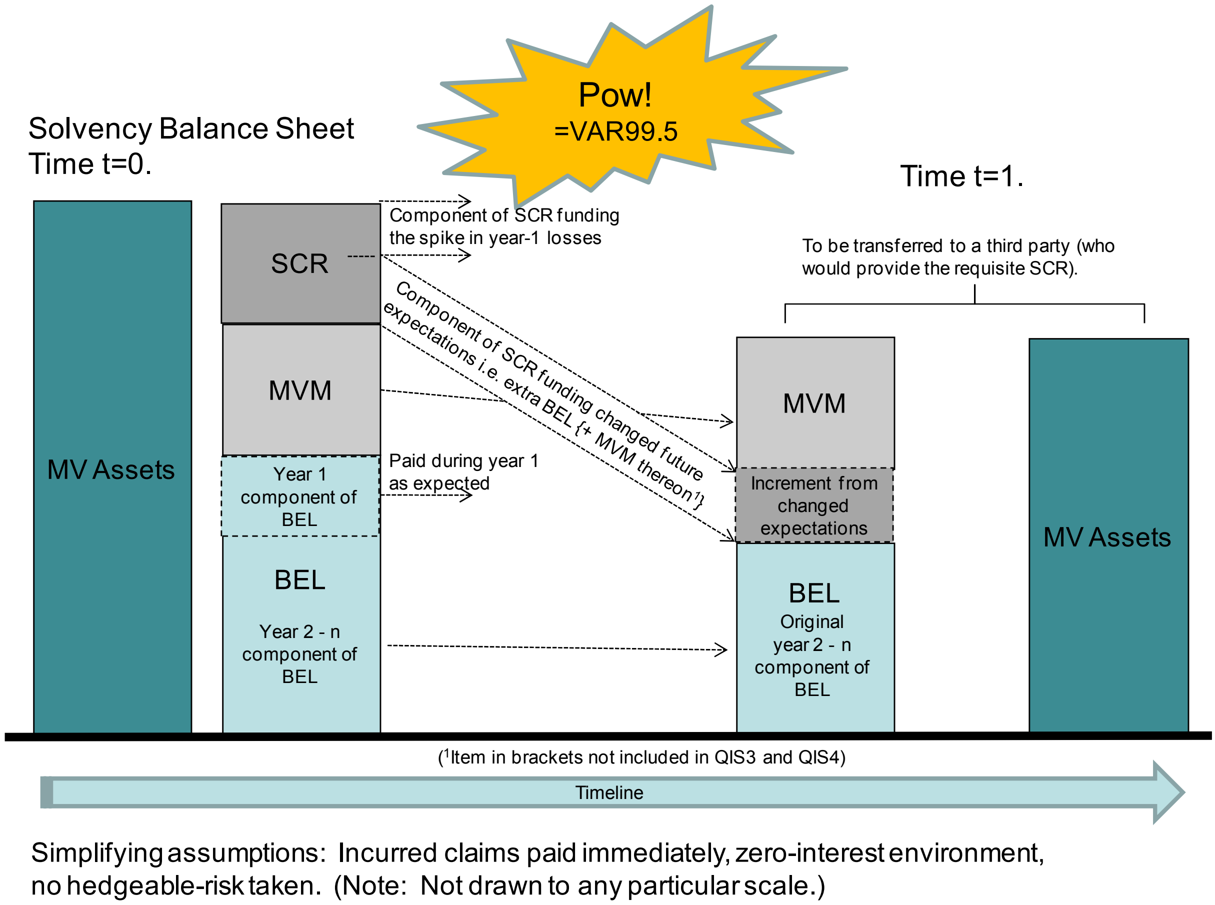


Figure 6. The Solvency II Concerto: one-year risk measure in harmony with market value margins. (Simplified depiction.)

5.1.10 Despite the rather melodious caption to Figure 6, it has to be acknowledged that the SCR and MVM concepts can make for somewhat uneasy bedfellows. Solvency, and hence the SCR, is of most concern to policyholders (see Section 2). The calculation of the SCR therefore, focuses mostly on potential loss variations *within the entity* concerned. It will, quite rightly, be influenced by the degree of diversification within the entity. The MVMs, on the other hand, need to be set at a level sufficient to entice a third-party, acting on behalf of its shareholders, to assume the liabilities in question. This raises issues of market-demanded reward for risk, similar to the pricing issues discussed in Section 3. Hence, the considerations involved in setting the MVMs extend *beyond* the narrow confines of *the entity concerned*. As we have already seen, intra-entity diversification is of less relevance in this regard. It is these tensions that result in some of the practical difficulties that we discuss in Section 5.3, in relation to the cost-of-capital approach to the calculation of the MVMs.

5.1.11 Finally, for the sake of completeness, it was mentioned in paragraph 5.1.6 that the MVMs are only calculated for non-hedgeable risks in the portfolio. The value of the hedgeable liabilities is taken as the market value of the instruments that replicate the liabilities.

5.2 THE COST-OF-CAPITAL APPROACH

5.2.1 The cost-of-capital approach has emerged as the preferred methodology for the calculation of the MVMs under Solvency II. Indeed, this type of approach is already in place under the Swiss Solvency Test (introduced in 2006).

5.2.2 A number of technical papers are available describing how the cost-of-capital approach works (see for example CRO Forum (2006) and CEA (2006)). Essentially, what the cost-of-capital approach does, is to add cost-of-capital supplements to the BELs, for the period of risk beyond the expiry of the risk-measure period (i.e. beyond one year) – but see also next paragraph. The aim of these cost-of-capital additions is to build into a firm's technical provisions the necessary return that a third-party insurer would require on the capital that it would have to tie up to support the block of business (consistent with the Solvency II risk measure), and thereby to induce the third-party to take on the business. This transfer is assumed to occur at the end of the one-year risk horizon.

5.2.3 At this point we modify our description of the MVM-SCR framework in general, and the cost-of-capital approach in particular, to point out a refinement to which we alluded in paragraph 5.1.6 and which we have been avoiding until now. The Solvency II framework directive itself has specified that the technical provisions be sufficient to facilitate their *immediate* transfer to a third-party (Article 75)[i] i.e. at any time during the one-year period of the risk measure and not only at the year-end.

5.2.4 It is interesting to observe that this refinement would appear to introduce an element of double counting or conservatism, as cost-of-capital loads are now even required for the year covered by the SCR itself i.e. for year 1, and not only for subsequent years as we have explained above. Strictly speaking, the SCR itself ought to cover all adversity within the 1-year horizon of the risk measure, to the 99.5th-centile confidence level. The risk-bearing capital is already in place for this time period. From a policyholder-protection point of view, there does not appear to be any need to build in a further cost-of-capital load with respect to the period of risk covered by the SCR. So for example, if a firm only had liabilities in its portfolio with an outstanding term of one year or less, there ought to be no need to add an MVM to the BEL, as the SCR, which is already held by the firm, should cover the requisite 99.5th-centile adversity that could occur over the year.

5.3 ASKING QUESTIONS

5.3.1 The Solvency II framework directive specifies that the technical provisions should be market consistent, in the sense that they are required to be "equivalent to the amount insurance and reinsurance undertakings would be expected to require in order to take over and meet the insurance and reinsurance obligations" (Article 76(3)). However, the framework also stipulates a cost-of-capital methodology for the calculation of the risk margins i.e. the MVMs (Article 76(5)).

5.3.2 Are these two requirements necessarily reconcilable? Will the proposed cost-of-capital approach really deliver "what it says on the Solvency II can"? Will it ensure that the technical provisions are adequate to facilitate a transfer of the liabilities to a third party – within the 1-year risk-measure horizon – on commercial terms and without any further capital injection by the firm's shareholders, beyond the existing SCR (with a 99.5^{th}-centile degree of confidence)? The following three concerns would seem to arise:

i. We have already attempted to demonstrate in Section 3 that a uniform cost-of-capital rate simply cannot capture the different market-risk-premia that appear to be demanded for different types of insurance risk.

ii. The fact that the SCR, which largely forms the capital base that drives the cost-of-capital loads, could differ between firms depending on diversification differences, means that different companies could conceivably be placing different "market-consistent" values on like liabilities.

   The size of this problem may be reduced through the use of narrowly defined policy-segmentation groupings in combination with standard-formula SCRs as specified in Quantitative Impact Study no. 4 i.e. QIS4 (see CEIOPS, 2007) and as re-emphasised by CEIOPS in a subsequent consultation paper (CEIOPS, 2009)[ii].

   However, this would certainly be a far more substantial issue under the approach proposed by some, namely to allow for diversification between all the non-hedgeable risk-types within the firm, when calculating the SCR to be used as the capital base from which to drive the cost-of-capital loads (see, for example, CRO Forum (2008) and CEIOPS (2008)). As the SCR for a diversified insurer is less than the aggregate SCR that would result if that diversified insurer were to be unbundled, it follows that the total technical provisions for the unbundled insurers (including the cost-of-capital loads) will be higher than when these same liabilities find themselves in a diversified entity. Accordingly, relatively undiversified insurers will be able to afford to pay a higher transfer premium to a potential transferee, than would a diversified insurer. Or, to look at it from the other side, such an approach would appear to leave the policyholders of diversified entities with relatively less security than those of undiversified insurers. The events of September 2008 demonstrated that even big diversified groups can get into trouble and if they do, their portfolio may need to be unbundled to permit digestible chunks to be swallowed up by interested third parties.

iii. As may be apparent from Figure 6, within a solvency context such as Solvency II, the adequacy (or otherwise) of a firm's MVMs will be tested subsequent to an extreme event being experienced by the firm. At that point the MVMs have to be sufficient to support the transfer of the obligations to a third party without any additional capital being required.

The likelihood is, that in the context of an extreme-event environment, the then market-consistent MVMs will exhibit a step-change upwards, which will probably be exacerbated if the firm's extreme event occurs when other firms are experiencing similar problems. The use of a long-run average assumption (which would include past periods of stress) as currently appears to be favoured (see CEIOPS, 2009)[ii] seems unlikely to produce MVMs that will "work" at precisely the time that they are needed. In times of stress, potential third-party insurers would have to be induced by the prospect of materially better-than-average expected returns before assuming the liabilities in question. By the same token, the firm's own shareholders would need to be induced by better-than-average prospective returns before entrusting any further capital to their management whose competence may, by now, be under scrutiny!

5.3.3 A detailed critique of the cost-of-capital-approach is to be found in Ernst & Young (2007).

5.4 Possible tweaks

5.4.1 Despite its technical challenges, the one-year risk measure together with the holding of "market-consistent" technical provisions as proposed under Solvency II, does seem to be an attractive and pragmatic approach to solvency-related regulation of insurance firms writing multi-year business. However, in Section 5.3 we questioned whether the regulatory objectives with respect to financial strength, will indeed be achieved by the currently proposed cost-of-capital approach.

5.4.2 A couple of "tweaks" to the methodology may, however, result in a more robust outcome:

i. Insurers should be encouraged to place broadly the same MVM on equivalent (unbundled) liabilities. Furthermore, the technical provisions so derived need to be broadly "market consistent" with the prices at which like risks are currently being assumed by potential third parties. Arguably, this is exactly the intent of Articles 75 and 76(3) of the directive proposal, as quoted above in paragraphs 5.2.3 and 5.3.1 respectively. Unfortunately, as we have described above (see paragraph 5.3.2), this is not easily achievable through the cost-of-capital approach stipulated in Article 76(5). Possibly however, these objectives could be achieved were regulators to specify benchmark provisions or MVMs for specimen products or risk types. Insurers would then use these as a means to calibrate the valuation models used to value their entire portfolio of non-hedgeable risks.

   There seems to be a hint towards this type of approach in the QIS4 technical specification (CEIOPS, 2007) where a "risk margin proxy" is discussed (see TS.IV.O there). However, rather than being the "poor man's" answer to the calculation of MVMs, it would seem to have merits as a mainstream solution.

ii. The MVMs proposed in (i) above would be calibrated to the then-current market environment and would hence be appropriate for the technical provisions. However, in order to provide for the likely spike in the market cost of risk, i.e. in the MVMs, under a situation of stress (consistent with the Solvency II risk measure), a second set of MVMs could be specified for stress purposes (again specified by regulators to ensure fairness and consistency between firms) with the resultant *additional* financial-resource requirement that would flow from this, being included in the SCR.

5.4.3 An alternative to having the regulators actually specify the level of technical provisions for benchmark risks (under both then-current and stressed environments) would be for the regulators simply to specify the benchmark risks themselves. Firms would then publicly disclose the “market consistent” technical provisions for these points, as calculated by their own valuation models. Market discipline ought to ensure that no firm sets up technical provisions (or stress supplements) that are outside an acceptable range. This approach is analogous to the UK Financial Services Authority’s realistic-reporting disclosure requirements with respect to specimen assets and option costs (see paragraph 6 of Appendix 9.4A of FSA (2007)).

5.4.4 With adjustments of the nature specified above, one can begin to envisage a smoother integration between accounting technical provisions pursuant to phase II of the IASB’s accounting-for-insurance-business project and the Solvency II technical provisions. The “current environment” technical provisions calculated as outlined in paragraph 5.4.2(i) could potentially be used for both financial-reporting and solvency-provisioning purposes. The additional resources required to back the spike in MVMs pursuant to a situation of stress under the Solvency II risk measure would be included within the SCR. In addition, the SCR would capture losses to the firm arising from statistical variations over the period of the risk measure, as is currently proposed.

6 A final word: Communication

6.1 In this paper we have put forward ideas – without any claim to originality – that de-emphasise the pre-eminent position that capital and returns thereon currently occupy in many aspects of the financial management of insurance firms. We have limited our discussion to questions of pricing, risk-transfer and reserving (Solvency II). Ultimately, most of the logic behind the "anti" return-on-capital ideas discussed above can be traced back to the Economic Balance Sheet set out in Figure 4 and the aspiration to build genuine shareholder value. Similarly, the EBS framework can be used by a firm for the evaluation, from a shareholder perspective, of decisions relating to dividend payments and share-buybacks.

6.2 A trawl through the websites of many leading companies tends to confirm that firms are not managing their businesses within an EBS framework. Whilst all firms will no doubt claim to be striving to create shareholder value, targets are generally return-on-capital focused (e.g. ROE, RoRAC) or earnings focussed (e.g. IFRS earnings, earnings per share, embedded-value earnings). The discussion in the earlier sections of this paper will, hopefully, have illustrated that return-on-capital measures and earnings measures are not necessarily aligned with shareholder-value creation.

6.3 Consequently, a firm adopting an approach to steering based on attempting to increase shareholder value taking into account the various items on the EBS, will have a communication challenge on its hands. This communication will need to convince its internal stakeholders (management at all levels) of the need to take an "outsider's" view in the quest for the creation of shareholder value, rather than the more traditional and easily understood introspective view of value creation. Financial targets and management incentives will need to be reset appropriately.

6.4 Equally importantly, the firm will need to communicate very clearly with external stakeholders such as shareholders, analysts, rating agencies and regulators, to enable them to develop an appreciation for the strategic actions taken by the firm and to help these stakeholders to set their expectations accordingly.

Acknowledgements

I am very grateful, in particular, to the following colleagues and business associates who have very kindly offered comments on various sections of this paper, as they were being developed: Michael Ege, Harald Fischer, Nghiep Luu, Sebastian Maaß, Ralph Ronnenberg, Paul Sweeting and Jan Willing. This should not be taken to imply that the aforementioned necessarily agree with all the views expressed herein!

All remaining errors remain mine alone.

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All links correct as at December, 2009.

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APPENDIX
Some advantages of within-entity diversification

A1. In Section 3.2 we argued that a diversified insurance company need not necessarily be a significantly better proposition for investors than would be a basket of undiversified insurance companies. The example that we used excluded any possibility of the insurer having a franchise value. We also assumed that the undiversified companies were structured so as not to be inefficient from a tax point of view i.e. no or only limited costs of double taxation on the risk-bearing resources financed by shareholders. In this appendix we illustrate two possible advantages of a diversified-insurer model, over an undiversified-insurer model. The first deals with advantages relating to a firm's ability to support a sizeable franchise value and the second deals with relatively lower frictional costs of capital, particularly when the entity finds itself operating in a less tax-efficient environment.

A2. ADVANTAGE 1: DIVERSIFIED ENTITIES MAY BE BETTER PLACED TO SUPPORT A LARGER FRANCHISE VALUE

A2.1 In Section 3.4 we set out a firm's economic balance sheet or EBS (see Figure 4) and defined its franchise value as being the excess of the firm's market capitalisation over its net assets.

A2.2 As can be seen from Figure 4, a key component of a firm's franchise value would be what we have labelled the "brand value", being the value that the market places on the firm's ability to write value-positive business in the future. This brand value will have necessitated some prior "investment" by the firm on behalf of its shareholders. Examples of such investment could be the building of relationships with clients and intermediaries or the creation of a global infrastructure capable of underwriting and accepting a wide range of risk types. The firm's brand value is only likely to be sustainable if it is not easy for competitors to jump in and snatch the first-firm's future value-positive new-business prospects without much investment themselves i.e. only if there are some "barriers to entry".

A2.3 For an insurance company having a brand value on its EBS, there is the risk that the brand value could be significantly damaged were the firm to become financially distressed, which we take to mean the situation that would exist were the firm no longer able to demonstrate an adequate claims-paying ability to current and potential clients (e.g. were the firm's risk-bearing resources to fall below the level necessary to support a particular rating demanded by the firm's clients – see Bergman (2008)). Aside from the loss of brand value, there would be additional direct costs in terms of management time spent addressing the situation, advisor fees and possible capital-raising costs. The extent of the loss of brand value and the aforementioned direct costs would depend on how badly the firm's available financial resources fell below the required resources and how quickly and successfully management was able to remedy the situation. The possibility of this loss of the brand-value asset together with the associated direct costs of financial distress are encapsulated within the "costs of financial distress" item on the liability side of the EBS. (As an aside, if the shortfall was so great that the firm went well and truly bust, the best solution from the shareholder point of view might be for management to pack up and go home i.e. to exercise their LLPO.)

A2.4 The key drivers of the size of the "costs of financial distress" item would hence be (i) the size of the brand value (i.e. how much is at risk from the shareholder perspective) and (ii) how frequently the firm could be expected to be in a situation of financial distress i.e. of not meeting its customer's financial-strength requirements.

A2.5 To investigate the second of these two items, i.e. the probability of financial distress, we have modelled a diversified and undiversified firm. The diversified firm is the same firm as that described in paragraph 3.2.3(ii), i.e. consisting of 10 identical but independent risks whose losses follow Pareto distributions. The undiversified firm contains only one such risk. Each firm is assumed to have a financial-strength requirement of meeting all its claims over the year, this time, with a 99% probability. The start-year available financial resources (AFR) are assumed to equal the financial strength requirement i.e. there is no excess capital initially. The undiversified firm's single risk has been scaled up such that the risk-bearing resource requirement of each firm is the same.

A2.6 We then simulated many thousands of annual outcomes over the year for each firm. In Figures A1 and A2, we show the AFR at the end of the year for the diversified and undiversified firms respectively. Customer default is assumed to occur when the AFR falls below zero. Financial distress (but not default) is assumed to occur when the year-end AFR is positive but is below the capital requirements (labelled the "RBC line").

A2.7 What we can see from these two figures is that whilst the probability of default from a customer point of view is the same for each firm (the red area in the figures = 1% as expected; the expected loss given default does, of course, differ), the probability of financial distress occurring but without actual default, which will result in shareholder, but not policyholder, losses (the orange area in the graphs) is substantially lower for the diversified entity (1.6% per Figure A1) than for the undiversified entity (14.7% per Figure A2). (The exact magnitudes are obviously a function of our assumptions.)

A2.8 The lower probability of financial distress for the diversified firm would suggest that diversified insurers are a more suitable platform than undiversified insurers for shareholders to undertake the necessary investment to finance the build-up of a firm's brand value. (Note that actual share-price mark-downs for financial-distress costs suggest that investors add something similar to a credit-risk-aversion premium to these simple statistical probabilities of distress – see Almeida & Philippon (2007)).

A2.9 A cleverly constructed reinsurance or other protection program, might materially reduce the undiversified firm's financial distress costs (see paragraph 4.3.15).

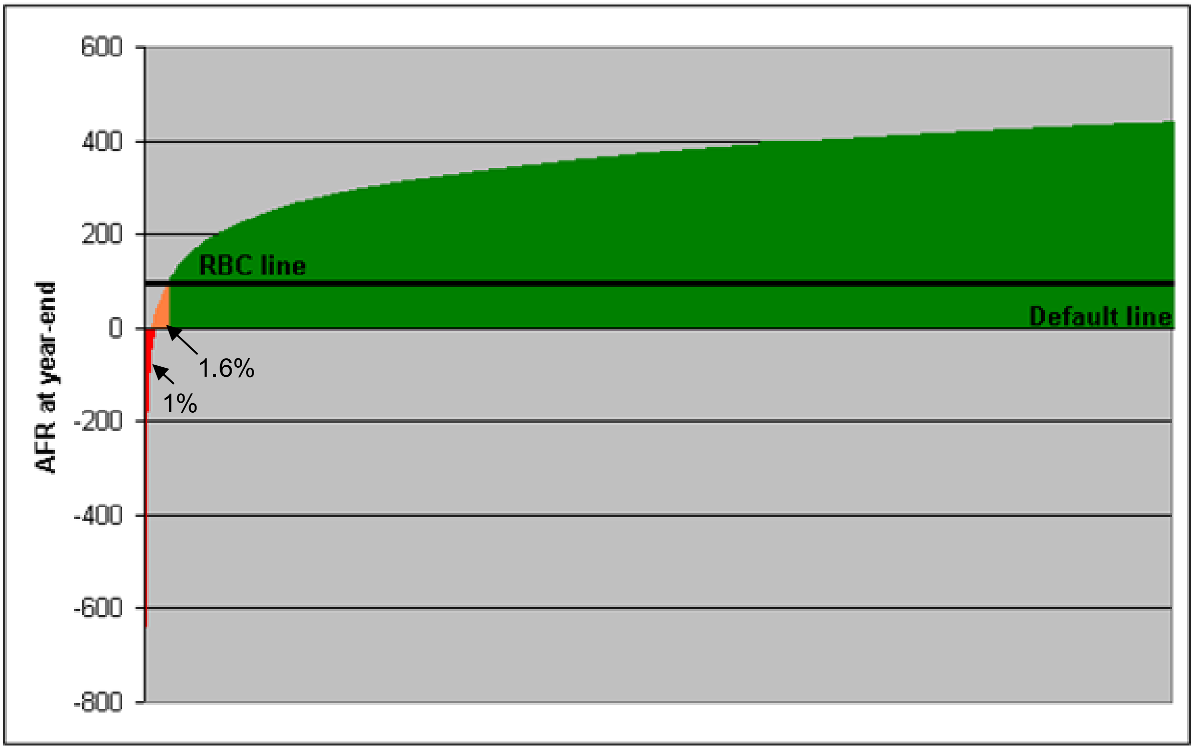

Figure A1. Distribution of year-end AFR – diversified company (ascending order)

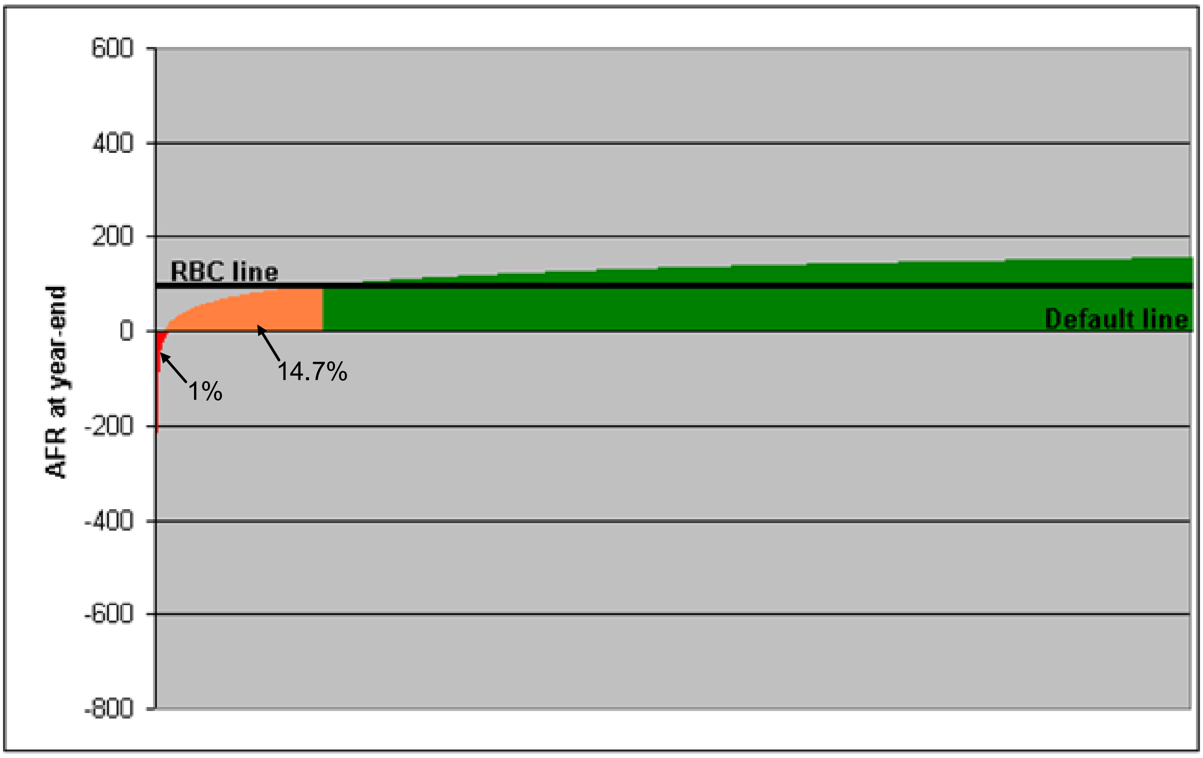

Figure A2. Distribution of year-end AFR – undiversified company (ascending order)

A3. ADVANTAGE 2: DIVERSIFIED ENTITIES MAY SUFFER RELATIVELY LOWER FRICTIONAL COSTS ON CAPITAL

A3.1 The example discussed in Section 3.2 assumed that both the diversified and undiversified entities had structured or domiciled themselves in such a manner as to be tax efficient. This is by no means an implausible assumption. The SPVs that issue Cat Bonds suffer no double taxation with respect to the investment income earned on the risk-bearing resources injected by investors. (These SPVs tend to be owned by charitable foundations, whilst the capital injected by investors is classified as loan capital.) Alternatively, certain jurisdictions (e.g. Bermuda) offer low or zero-corporate-tax regimes to companies, which also limits or eliminates any double-taxation drag to shareholders.

A3.2 However, should the entity find itself operating under a more conventional corporate structure in a jurisdiction that levies tax on its profits, then, from a shareholder perspective, there is a double taxation burden arising on the shareholder-sourced risk-bearing funds held within the firm (see the EBS – Figure 4). Not only does the company pay tax on any investment earnings emanating from these funds, but subsequent dividend payments may also be taxed in the hands of shareholders – hence the term "double taxation". Furthermore the impact of tax on the entity's profits may be asymmetrical. By this is meant, that whilst all profits will suffer taxes, not all losses will benefit from tax relief. Large losses may need to be carried forward to be relieved against future taxable profits. Very large losses may never benefit from tax relief. This volatility-driven delayed or even expired tax-relief on losses, increases the entity's effective tax rate.

A3.3 As diversified entities require less capital per unit of risk written and generally have less volatile earnings than do less well diversified entities, it follows that they are more efficient from a shareholder perspective, with respect to tax-driven frictional costs-of-capital, than are less diversified entities.

A3.4 Some feel that the "Agency costs" item on the EBS is also related to the total risk-bearing resources sourced by the shareholders, giving diversified firms significant advantages over less-diversified firms in this respect too. Our own view is that the agency costs are probably more closely – but not necessarily exclusively – driven by the amount of excess capital resources held within a firm, which is not necessarily dependent on the firm's degree of diversification.

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[i] A more recent version of the Solvency II Directive, dated 19 October 2009, as published by the European Parliament, may be found at http://register.consilium.europa.eu/pdf/en/09/st03/st03643-re01.en09.pdf. The Articles referenced in Section 5 have moved up by one in the more recent editions of the Directive.

[ii] CEIOPS' Level 2 advice to the European Commission published in November 2009 takes a similar approach. See "Final CEIOPS' Advice for Level 2 Implementing Measures on Solvency II: Technical Provisions – Article 86 (d) Calculation of the Risk Margin", available for downloading at http://www.ceiops.eu/content/view/17/21/#2009.