



PROTECTED CELL COMPANIES IN BERMUDA

by Michael N. Smith

In case you missed it, Protected Cell Companies (PCC) have arrived and are generating a high degree of interest in supporting complex reinsurance transactions. Bermuda is on the leading edge in developing this technology with applications in both the property and casualty and life and annuity worlds. This article will provide an overview of the development of Protected Cell Companies in Bermuda.

What They Are

Some jurisdictions call them Protected Cell Companies; Bermuda calls them Segregated Account Companies (SAC). Regardless of the name, these are handy vehicles that serve a variety of needs and possess an interesting duality.

In Bermuda, an SAC is a corporate structure composed of segregated accounts and a general account. A segregated account, or cell, is an account that contains assets and liabilities which, via statute, are separated from any other assets or liabilities within the SAC. This legal separation protects the assets of the cell from the liabilities of any other cell as well as from the general account.

Therefore an SAC has the interesting duality of being a single corporate body, but wrapped around a series of cells that do not have "legal personality" but can operate like mini-companies, where the liabilities of a cell can only be applied against the assets of that cell.

continued on page 2

CONTENTS

- 1 PROTECTED CELL COMPANIES IN BERMUDA
Michael N. Smith
- 4 CHAIRPERSON'S CORNER
Graham W. G. Mackay
- 6 FREQUENTLY ASKED QUESTIONS ON PROTECTED CELL COMPANIES: A RATING AGENCY'S PERSPECTIVE
Henry K. Witmer
- 8 LIFE REINSURANCE SECTOR: RATING AGENCY VIEW
Neil T. Strauss
- 10 THE MARKET FOR MORTALITY
Paul Sweeting
- 13 LIFE TREATY PROJECT UPDATE
Tim J. Ruark
- 15 EMPLOYER STOP LOSS INSURANCE CONSIDERATIONS
Mark R. Troutman
- 19 PROVIDER EXCESS INSURANCE CONTRACT CONSIDERATIONS
Gregory G. Demars
- 22 REINSURERS AND DIRECT WRITERS: COMPARATIVE RESULTS FROM THE RECENT SOA MORTALITY TABLE STRUCTURE SURVEY
Mark Swanson
- 27 OPTIONS FOR ACTUARIES
Michael Frank
- 30 ACTUARY TAKES ON ALL CHALLENGERS TO WIN IQ SHOWDOWN
Tom F. O'Sullivan

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Protected Cell ... from page 1

Where They Came From

Bermuda was at the forefront of the development of the SAC concept, due to Bermuda's deep experience in the development of captives. With captives came the development of rent-a-captives, which provided a single corporate "host" for clients who did not want the expense and governance of setting up their own captive. The SAC is a logical extension to the rent-a-captive concept, because the pioneer rent-a-captives used private contractual approaches for internal segregation that were not fully effective in creating absolute segregation, but the SAC concept perfected a legal division.

In Bermuda, the first SAC was created through the use of a private Act in 1991, and then the Segregated Accounts Companies Act was enacted in 2000.

The first public legislation was introduced in Guernsey in 1997, with the Cayman Islands following in 1998. Other jurisdictions with public legislation are Bahamas, Barbados, British Virgin Islands, Jersey and Mauritius. The NAIC has developed a Model Act for segregated accounts for the limited purpose of securitizations that has been adopted in Illinois, Rhode Island and South Carolina.

Their Rules

Assets in an SAC cell must be held in a separate fund that is not part of the general account, and it must be held for the benefit of the cell owners and counterparties. These assets cannot be used to meet the obligations of the general account, such as the general shareholders or creditors with claims that are not linked to the cell.

For commercial purposes, an asset (such as a bank account) may be held to the credit of more than one cell, or there may be (re)insurance contracts between multiple cells and/or the general account. Bermuda's Act allows for this, provided the records of the SAC clearly indicate this is intended.

Liabilities of the cell are linked only to that cell, and creditors of these liabilities have no rights against any other cell. Under Bermuda's Act, any creditor claim or liability that arises, but is not linked to a specific cell by default, is presumed to be a liability of the general account. The Act also prescribes specific priority positions upon insolvency of the cell.

However, the Bermuda insurance regulator seeks to prescribe that every (re)insurance contract with a cell must stipulate in its wording that the cell owes no obligation under the contract that goes beyond the resources of the cell. Under such a contract, it is believed that the cell can never technically be insolvent, but this may conversely jeopardize the cedent's ability to achieve full risk transfer unless the cell is adequately capitalized.

The rights and obligations of the owner of a cell must be set out in a governing instrument (similar to the articles or by-laws of an ordinary company), which cover various permissions and general management powers. Examples of governing instruments are a participation agreement and a preferred share agreement. But the Act governs the distribution of capital from the cells (such as dividends); the rules of which are consistent with the rules applicable to the distribution of capital of an ordinary insurance company.

Current Regulatory Issues

The Bermuda insurance regulator has indicated that the supervision of SACs will expand to the cell level to ensure a consistent application of the standards followed by stand-alone companies, such as (among other things) the existence in the SAC of adequate management expertise commensurate with the nature of the liabilities in the cell. This would serve as an indication that the SAC concept is growing in popularity as a risk management tool.

Their Uses

In general, whenever a company is established for a specific single purpose, the owner of that company faces the prospect of capitalizing and managing that company single-handedly, or they can utilize an SAC that already has capital and a management infrastructure. In the insurance world, the SAC has found many uses.

Rent-a-Captives

As noted above, an SAC is an elegant solution to providing rent-a-captive solutions. As the captive

concept increased in popularity and captive entities began to proliferate, aggregating these entities into an SAC provides the client with expense and, most importantly, capital savings because the client is able to "rent" the capital in the general account. Such savings opened the market to smaller corporations who previously felt a stand-alone captive solution would have been too costly.

Transformers

A transformer company transforms capital market risk into insurance risk. For example, an insurance company seeking to hedge their GMDB risk (capital market risk) but avoid the statutory accounting noise from directly holding capital market derivatives, may reinsure their risk to an SAC cell (insurance risk), which in turn hedges the risk by investing in derivatives.

Securitizations

An emerging application for the SAC concept is in the area of life securitizations, for either mortality catastrophe bonds, or for XXX collateral arrangements, where the cell assumes the risk through an incoming reinsurance treaty and issues notes into the capital markets or to a single, private investor. The duality of an SAC may provide the cedent with favourable statutory accounting treatment of the notes.

References

Further information on Bermuda's SAC Act can be found on the Web site of Appleby, one of Bermuda's leading law firms, at the following address: http://www.applebyglobal.com/uploaded/Publication/390_File_5.pdf *



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CHAIRPERSON'S CORNER

by *Graham W. G. Mackay*

Not so long ago, I was discussing the impact that the ERM movement was having on the commercial reinsurance market with a small group of industry friends. “Generally, not so good” was one conclusion, which was quickly followed by “reinsurance used to be thought of as risk management.” I wonder if this group would hold the same opinions today. Here are mine ...

In general, ERM takes a broad look at risks to which a company is exposed. The discipline seeks to quantify these risks, allowing management the opportunity to better understand and manage these risks. There are a few choices: avoid them, transfer them to another party, or to retain them. A company choosing to retain the risks has the option to mitigate the risks through a hedging strategy, or to accept the volatility that is associated with the risks. The point is that the company is better able to understand the risk dynamics and can make knowledgeable and informed decisions regarding the management of its risks.

In terms of buying reinsurance protection, I do think that the paradigm has changed. The buyers and insurers now better understand their risks and the impact that a potential reinsurance transaction can have on the capital necessary to support their risks. Insurers have become more active in structuring reinsurance transactions that will meet their specific economic goals. The reverse is also true; insurers have also become less passive in accepting proposed structures that do not quite meet their economic goals.

This is a good thing, although it does demand more effort from the reinsurers. The interesting thing is that the reinsurers have also embraced the ERM initiative and are applying this discipline to their own risk management programs:

- **Improved Underwriting Discipline:** Reinsurers are continually improving their risk analyses and are more careful to only take on risks that they understand and can quantify. This reduces the chance of assuming latent risk, and increases the chance of charging a fair price for the risk that is assumed. Negotiations with an equally sophisticated seller are more likely to bear fruit for both parties.
- **Product Development:** Reinsurers are beginning to re-enter markets that they abandoned only a few years ago. The variable annuity market, as an example, has seen the return of the reinsurers to support new products. This has only come about as the ability to identify and quantify the risks has improved, in addition to the reinsurers' ability to leverage structures which creates attractive economic outcomes for both parties.
- **Financing Solutions:** In terms of transferring risks to third parties through reinsurance and in managing its retained risks, reinsurers use the same principles or risk management as used by the large sophisticated insurers. However, when considering the relative impact to the bottom line, these programs can have a much greater impact for the reinsurers than the insurers. These programs include increasingly complex retrocession programs, and the vari-

ous shades of capital market solutions designed to reduce capital requirements and restructure the company's balance sheet.

So has ERM benefited the reinsurers? I think YES.

I would also like to offer my thanks to the contributors of this newsletter and to the Editor and his team that "herded us cats" to print. This edition includes a strong line-up of articles ranging from current issues such as an update on the Life Treaty Language project to emerging issues such as Segregated Account Companies in Bermuda. Our contributors also touch on the life and health reinsurance sectors in broad terms in addition to the life settlements market. Finally, we profile one of our members as he works the game show circuit in Canada.

Election Results: They are In!

I would like to welcome Ronnie Klein, David Addison and Michael Frank to the Council. Congratulations. And thank you to all that took the time to vote. At the same time, I would like to thank our outgoing Council members, Larry Carson (Past-Chair), Craig Baldwin (Continuing Education) and Mark Troutman (Marketing and Membership Value) for their tireless effort to support the section, and congratulations to Gaetano Geretto as he takes the reigns to become Chair of the Reinsurance Section Council.

On a final note, this is my last column as Chair for the Reinsurance Section Council. I would like to thank you for the opportunity to serve you and I am grateful for all the support that you and the Council have given me. This is one of the more active sections in the SOA which creates many advantages and well as a few challenges.

Please be as active as you can in your Section's activities and do not hesitate to call upon any of your Council members with suggestions for new activities as well as areas where you can contribute. ✨



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FREQUENTLY ASKED QUESTIONS ON PROTECTED CELL COMPANIES: A RATING AGENCY PERSPECTIVE

by Henry K. Witmer

Rating agencies are often asked to offer comments on emerging issues. It makes sense, as companies are seeking to make critical decisions on developing their business, or on how to structure a specific transaction, it is critical that management understand how their decisions will be viewed by third parties.

The danger to a rating agency in answering any general questions is the risk that statements are taken out of context. As with any business decision, the facts and circumstances must be understood before a view can be developed.

The following will provide answers to specific questions regarding the use of Protected Cell Companies (PCC). I'll tell you the same thing that I tell my clients: the information in this article may not directly apply to your own specific situation. However, I do hope that you will gain a better understanding of the issues that a rating agency will consider when reviewing the use of a protected cell company.

Question: *It is quite clear by now that Protected Cell Companies are being formed in increasing numbers and utilized in ever more unique and targeted ways to handle risk exposures. From a rating agency perspective, where do you see this going and is it beneficial to the risk management community?*

Answer: There is an interesting dynamic here whereby risk exposures are continuing to evolve and to grow or diminish relative to others as economic, political and social circumstances develop. Concurrently, the ability (and willingness) of commercial insurers to respond to the needs of the risk management community may not arise or be available in a timely fashion. This leads to an ever faster search for solutions, which over time has led to captive formations, group captives and risk retention groups, and now protected cell companies. The flip side to this search for risk financing options is that the entities created to provide the protection may not be capable to respond when needed. This could especially be true, in this case, if a protected cell is so narrowly focused or insufficiently capitalized that its own risk profile may be more volatile than the entity seeking protection from it.

Question: *What key factors should a risk manager be aware of when looking to a protected cell company to handle the exposures of its organization?*

Answer: In order for use of a cell captive to pass muster with senior management and corporate governance mandates, a risk manager should perform as much due diligence on such an option as with any other risk financing solution, maybe more.

Let's look at this in a couple of steps:

If the insured organization establishes its own Protected Cell Company, which will be a licensed insurance organization, and subdivides its risks into a number of protected cells (PC) within the PCC. For all practical purposes, this is similar to establishing a pure captive insurer but with the added feature of being able to monitor lines of business or the results of subsidiary operations on stand alone bases for better allocation of the costs of risk within the parent organization. So long as each cell has the financial flexibility for access to additional funding should it run into claim payment difficulties, this option should be relatively equivalent to that of a pure captive operation.

On the other hand, if the risks of an organization are placed into protected cells which either have no access to additional funding and/or are under the umbrella of someone else's PCC or Core, then a careful review of that PC needs to be performed to ensure that the anticipated protection will exist should it be needed. In this case, the protected cell will have limited ability to pay claims. What will justify its use is if the risk manager is very cognizant of the quantity of risk transferred both on an expected basis and on a worst-case scenario, compared with the capabilities of the PC to respond to those potential claims.

In most cases, due to its smaller size and limited scope, an individual PC will not have sufficient resources to supplement its own should adverse circumstances occur. Its own results, therefore, have the potential to be considerably volatile, unless the scope of coverage is very carefully defined and limited. Nonetheless, due to the flexibility allowed in the contractual arrangements in establishing a PC, mechanisms can be incorporated to allow for vari-

ous means to either fund the cell adequately upfront for all circumstances, or to have access to additional funding from the PCC or from the owner of the cell. So long as the program meets the needs of the risk manager and is part of the overall enterprise risk management solution, this option should be viable and beneficial.

Question: *Given the potential volatility in the PC, how would a rating agency evaluate a protected cell or the sponsoring PCC?*

Answer: There are some significant dissimilarities between evaluating or rating a protected cell and evaluating or rating a PCC for reasons that are related to their role in assuming risks. For a PC, the mechanism will be somewhat comparable to the process of assigning a financial strength rating to any other type of insurance entity, including captive insurers. The analytical team will examine the PC's financial condition, its risk profile, its actuarially determined loss and IBNR reserves, and the credit exposures it has. In addition, a thorough review will be made of its contractual relationships with other protected cells, if any, and with the core PCC. As mentioned before, financial flexibility and the adequacy of the PC's capital relative to the risks assumed are the critical factors in this analysis.

Utilizing the position that all the risks placed with a PCC organization are at the level of the individual protected cells and that the PCC core does not take any underwriting risks from outside parties, the analysis will focus on the likelihood of the PCC's own capital base being eroded from any contractual relationships it has with the member PCs. This could take the form of capital maintenance guarantees, stop-loss agreements, or similar arrangements with the PCs. Here too, the contracts need to be examined carefully to determine the extent of these liabilities as well as the potential for attachment of funds by a regulator or a court of law in the case of any PC becoming insolvent. In these cases then, a financial evaluation of all PCs, which could have a potential material impact on the PCC, needs to be conducted, regardless of whether those PCs are rated or not, and the aggregate exposure to the PCC must be compared with the PCC's resources to respond to those needs.

It should also be made clear that a financial strength rating on a PCC does not automatically extend to the individual PCs within the protected cell company structure.

Question: *What are the value considerations for a risk manager in determining whether to utilize a protected cell or a protected cell company option?*

Answer: It really is all about risk. The PCC/PC option can provide a very focused and viable tool to manage risks within an organization. It offers a means to assume reinsurance from a fronting carrier and to isolate certain exposures from a more broad-based risk financing program. This may allow a fronting or a commercial insurer to be more responsive to the rest of the needs of a pure captive program. The protected cell taking on the risk, however, will still need to prove to a fronting carrier its risk handling capabilities or little credit will be given to it from a statutory capital relief perspective.

A protected cell also offers a smaller insured an entry into alternative risk transfer options that may be more cost effective than establishing a fully licensed captive insurer. This has the further benefit of giving the insured better control of its risks and their financing and provide it the experience needed should it wish to move to a pure captive in the future.

Control and monitoring of any protected cell captive program is crucial to ensure that the expectations for response to claim incidents will be met, given the capabilities and limitations of the cell captive. There are certain overlying themes and issues that will have an impact on the utility of such a program for the insured. Fronting carriers and reinsurers will also examine them carefully to determine whether such a program could still lead them to shoulder the risks that supposedly have been laid off to the cell. Important considerations include, the type of protected cell that is employed, whether open, closed or some variation in between; what the contractual relationships are among the cells in the program along with that of the core; what is the ability of the cell to absorb shock losses or adverse development; and, what is the regulatory framework under which the protected cell company and the PCs are established and monitored. ✱



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LIFE REINSURANCE SECTOR: RATING AGENCY VIEW

by Neil T. Strauss



Editor's Note: The following article was meant to appear in the previous issue of Reinsurance News. We regret any inconvenience.

Standard & Poor's Ratings Services' stable outlook on the U.S. life reinsurance sector reflects improved new business profits and improving availability of capital at low cost through securitization and other markets. However, the arrival of new entrants and low growth prospects in the largest markets might put the squeeze on profits in the future. Meanwhile, risk management and careful risk selection will continue the stable trend for most of the leading companies in the sector.

The overall reinsurance market has continued to shrink in the largest life reinsurance market—the United States. As per the SOA study, the cession rate (percentage of total life insurance risk reinsured) remained well below 50 percent in 2006—much lower than the earlier part of the decade. Pricing is part of the issue as pricing is higher versus that earlier time period. This is in spite of what has been a continued improvement in mortality for the population as a whole. The causes come from a few areas. First of all, aggressive competition among reinsurers in the early part of the decade led to pricing that was no doubt irrational. Reinsurers have simply come back to their senses. Second, reinsurers are tying up increasing amounts of their costs and capital in collateral to cover Triple-X reserves, and they have done a better job of reflecting this in pricing. Third, the reduction in reinsurer capacity due to consolidation means far greater pricing power for the remaining reinsurers. This improved pricing power means far better profit margins on newer business, but it is harder to come by.

Cedants are coping in a number of ways. Unable to pass the reinsurer price increases on in the competitive pri-

mary market, they must seek alternatives to maintain their own margins. One way is by simply retaining more. Whereas first dollar original terms coinsurance had been the norm (for example, reinsuring 90 percent of every risk on every term life insurance policy sold), the market norm is now excess of retention (reinsuring 100 percent of all risk above a fixed retention of \$1 million or \$2 million per life). This means that the reserve strain on the retained risk can be substantial.

However, increased availability of collateral sources has made this strain much easier to absorb. For the largest companies, this often means securitization of the excess reserve requirements. But for smaller companies, LOCs have become an increasingly viable option. Most of the top 30 U.S. life insurers now have a captive reinsurer to accept their excess reserve needs, collateralized by LOCs. European banks in particular have been willing to provide that collateral, with five-, seven-, or even 10-year (or more) LOC facilities now available for barely more than what a one-year LOC cost just a few years ago.

Following the more recent transactions of Swiss Re/ERC and SCOR/Revios, there have been not fewer than seven significant life reinsurance acquisitions in the past decade. During that time, major names such as Lincoln Re, Allianz Life Re, and ING Re have been removed from the map. And these latest 2 percent aforementioned transactions could indicate an end of consolidation in the sector. As a result, only five active companies had in-force market share of 5 percent or more in the U.S. in 2006 (based on the Society of Actuaries' study conducted by Munich Re). Given this level of consolidation—and the resulting improvement in margins—there is likely room for only modest further consolidation in the sector. Certain names will always be rumored due to lack of a clear strategic fit with larger global groups or financial impairment, but no further scurries for the exit are likely.

It is interesting to note that Scottish Re, with all of the turmoil associated with it over the past year, did not ultimately become a target of consolidation although it had been a consolidator. Following on the heels of troubled reinsurer Annuity and Life Re it would seem that the sector has more volatility than thought a few years ago and the accumulation of more mortality exposure is not necessarily a 'win-win'; it may not set the law of large numbers in motion if there are other issues.

With tough times finding growth in the United States as well as in the United Kingdom, another major life reinsurance market, companies are looking to new markets in unexpected places. Continental Europe is now seen as an attractive opportunity, with Solvency II seen as a key driver.

Although the ultimate impact of Solvency II is not yet known, the expectation is that capital requirements will increase for many life insurance products, which will spur EU life insurers to use more reinsurance than today. More importantly, capital requirements under Solvency II are expected to encourage diversification of reinsurance programs, which up to now has been far less common on the continent than in the United States or the United Kingdom. At the same time, many North American and other life reinsurers are intensely looking at emerging opportunities in the European and the under-reinsured Asian markets.

One of the biggest topics of interest for the sector recently has been the possibility of pandemic mortality. The most obvious risk that has received the greatest attention has been the H5N1 avian flu virus. Standard & Poor's Ratings Services continues to believe that the risk of human-to-human transmission of H5N1 remains low, but given the potential impact on life reinsurer capital, contingency planning is prudent.

Standard & Poor's regularly reviews the latest research on the area of pandemic mortality and continues to be skeptical of some of the most severe scenarios. In particular, the U.S. government's strategic plan (released May 2006) for coping with a pandemic has a worst-case scenario of up to two million United States deaths, which most critics have seen as unlikely. In its assessment, Standard & Poor's has considered a worst case, using the 1918 flu and other research as a basis, to be in the range of 30 percent - 50 percent additional deaths in a one- to two-year period, or as many as 1.2 million additional deaths in the United States. In our view, such a risk could be borne by most life insurers—particularly well-diversified ones—with only a moderate impairment to capital.

Life reinsurers, particularly those who focus purely on mortality risk, would be the most at risk and

could become financially impaired by a major pandemic—which could have an impact on the primary companies that rely on them. Despite the low likelihood, the significant severity of such an event means that preparation is sensible, and the capital markets have stepped up to make this possible. Swiss Re bought \$762 million in protection against extreme mortality events in its two Vita Capital transactions in 2003 and 2005. Scottish Re Group Ltd. entered into a similar facility through Tartan Capital Ltd. in 2006, raising \$155 million of protection. Such capital market transactions are likely to evolve further—particularly as market makers match up parties that are long on mortality exposure (life insurers and reinsurers) with those long on longevity (annuity providers). A vibrant market for insurance-related securitization is becoming a strong risk-management tool for this sector. Meanwhile, the major reinsurers themselves are becoming much more comfortable with longevity risk as pricing has improved in recent years.

Rick Flaspöhler's life reinsurance survey (presented in the July 2007 issue) discusses the pendulum swing in the relationships between cedants and reinsurers. How much do those relationships matter between cedants and reinsurers? Standard & Poor's posed this very question to its panelists, Rick Flaspöhler, President, Flaspöhler Research Group; Donna Kinnaird, President, Swiss Re Life & Health America; and Ronnie Klein, Vice President, AIG; in New York City in June 2007 at its Annual Insurance Conference in a panel discussion devoted to life reinsurance which I moderated. If you were not present for this fascinating discussion, you missed an interesting discussion between the originator of the survey, the largest life reinsurer and a major user of reinsurance. For a recap, please contact me at my SOA address.

A number of risks—within their products and in the competitive environment—will impact the life reinsurance sector in the future. The industry at large is strongly positioned to maintain financial strength, particularly given improved profitability of recent new business and diversity of capital-raising options. Further review will focus on whether increasing competition results in irrational pricing or whether lessons from the last cycle will keep the industry disciplined in 2007 and beyond. ✱



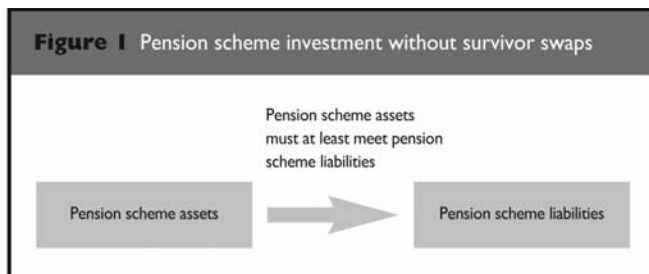
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THE MARKET FOR MORTALITY

by Paul Sweeting

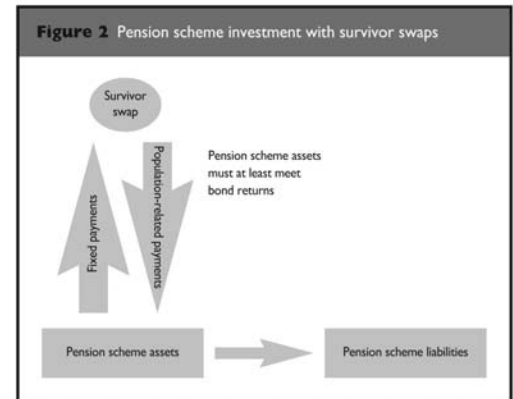
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Mortality risk is the risk that a portfolio will suffer from mortality being heavier than expected. Longevity risk is the risk that a portfolio will suffer from mortality being lighter than expected. Both types of risk are significant factors for pension schemes and life insurance companies. The International Actuarial Association defines four types of mortality or longevity risk: level, trend, volatility, and catastrophe. However, for practical purposes these risks can be classified into two types: the risk of getting the average wrong (systematic risk), and the risk of getting the average right, but being unlucky (specific risk). The latter of these risks reduces as the number of lives increases but this does nothing to reduce the former risk.



Risk Transfer

Reinsurance is a method of risk transfer that is used by insurance companies to reduce systematic risk. This is usually proportional (thus allowing an insurer to improve the mix of business written) or excess of loss (thus protecting an insurer from extreme events). Pension schemes use an approach similar to proportional reinsurance when they buy annuities, either as a matter of course for retiring members or as part of a bulk buyout of part or all of the membership. More recently, specialists have started to offer an increasing range of opportunities for the buyout of deferred benefits.



However, capital market solutions for these issues have only been explored relatively recently. Blake and Burrows (2001) were among the first to look at market solutions, discussing the idea of survivor bonds. The bonds in their paper are amortizing securities, the payments of which depend on the proportion of a reference population that is still surviving at the date of payment of each coupon. This makes them similar to annuities, but unlike annuities the payments from survivor bonds are based on the survival of a reference population, not the mortality of the institution purchasing the bond.

Blake and Burrows assume that the group of lives is based on an initial cohort retiring at age 65 and assume that the reference population is the population at large. However, they also point out two key risks:

- pensioner annuitants are likely to live longer than the general population (basis risk); and
- an individual insurance company's pool of annuitants might experience markedly different mortality to that of the overall population of pensioner annuitants (specific risk).

Mortality Bonds

Blake and Burrows suggest that such bonds might be issued by the government. This could also avoid any risk premium being charged in respect of the uncertainty surrounding mortality forecasts.

Although Swiss Re launched a successful mortality bond in 2003 – so successful that it launched a second in 2005 – this bond was simply a form of catastrophe bond which paid out in full except in cases of exceptionally bad mortality experience, and not a

bond in the format described by Blake and Burrows (2001). In fact, when BNP Paribas looked at launching a Blake and Burrows-style longevity bond with the European Investment Bank (EIB), the reception could be described as lukewarm at best, and the bond was withdrawn without being launched.

Blake et al (2006) give a number of reasons for the bond's lack of success. In particular:

- the bond was unable to reflect the wide range of demographic characteristics between schemes;
- investing in the form of a bond meant that to reduce risk meant to reduce expected return;
- a high degree of model and parameter risk existed;
- a high degree of basis risk existed between a pension scheme's mortality and the mortality of the reference population.

They also look at alternatives to the structure of the BNP Paribas bond in order to address some of the issues. For example:

- zero-coupon longevity bonds, which make a single, mortality-based payment, thus increasing flexibility;
- geared longevity bonds, where every £1 of capital buys more than £1 of exposure, thus reducing the amount of capital needed; and
- deferred longevity bonds, where the payments start at some point in the future, so no capital payments are required upfront.

Futures and Options

Futures and options on bonds are also investigated by Blake et al, providing increased exposure for decreased capital and also offering the opportunity for an asymmetric payoff pattern. With options, a pension scheme could protect against longevity increasing faster than predicted, but could benefit from slower than expected improvement. However, without a quoted price for an underlying security, agreeing a price for such derivatives would be a challenge.

Survivor Swaps

It is possible that a better solution is to avoid using a bond at all, and instead to use some other instrument altogether. In particular, survivor swaps offer a potential solution.

Dowd (2003) is one of the first authors to describe survivor swaps. He describes a swap based on the mortality experience of a reference population, where the population-dependent payments form the floating leg of the swap, with the fixed or preset leg being the expected amount of those payments assessed at the time of the swap. Such an instrument could be of particular interest to a pension scheme. The main aim of a pension scheme is to invest such that the investment returns are sufficient to meet the liabilities, as shown in figure 1.

A pension scheme could use survivor swaps to produce a series of payments that broadly reflect changes to the longevity of its members – all that would be required would be that the pension scheme assets produced sufficient returns to meet the series of fixed payments making up the preset leg of the swap, as shown in figure 2.

If the pension scheme wanted to take as little risk as possible, then it could invest in bonds to produce these fixed payments – but this would mean that the pension scheme might as well have purchased a mortality bond. Instead, a pension scheme could hold assets that it thought would be able to produce higher returns than those required to meet the fixed payments.

Since the fixed leg of a swap can be thought of as a fixed-interest bond, this would mean investing in assets that were expected to beat bonds.

However, there is a more elegant solution. If as well as a survivor swap, a pay-fixed interest swap is held, then the fixed payments from the interest rate swap can be used to meet the fixed leg of the survivor swap. This means that the assets now need to beat cash, a more conventional investment objective, as shown in figure 3 (see page 12).

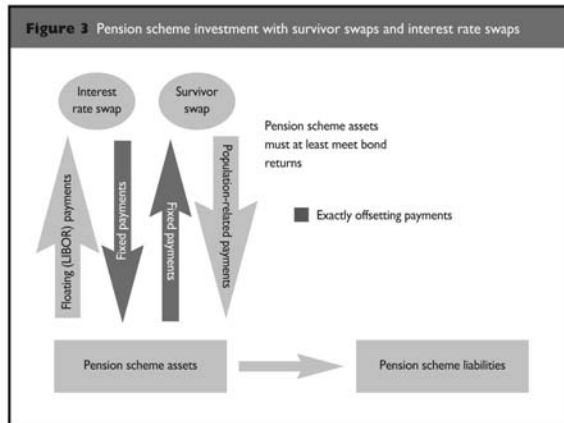
Blake et al (2006) describe two different types of survivor swap. The first is a vanilla survivor swap (VSS). This is where periodic floating payments are based on the survivorship of a reference population over the term of a swap. So, for example, a ten-year swap where the initial reference population was for 65-year-old men in



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continued on page 12

England and Wales might make annual payments in proportion to the number of people surviving to age 66, 67, and so on until age 75, who were aged 65 at the swap's inception. The fixed payments would represent the proportion of people who, at the swap's inception, were expected to survive to these ages.



Such a structure has clear attractions for a pension scheme, where the benefits are annuities. However, the structure might still be too inflexible for some. An alternative is to use a single-payment swap, where the floating payment represents the proportion of a particular reference population alive at some time in the future, and the fixed payment represents the expected proportion.

Natural Hedging

In this article, I have concentrated on the use of survivor swaps by pension schemes. However, while longevity is an issue for pension schemes, for life assurance companies mortality is often more of an issue. This suggests that pension schemes and life assurance companies might find themselves on opposite ends of survivor swaps, although a number of practical issues exist. Cox and Lin (2005) found that a degree of what they call 'natural hedging' appears to take place within insurance companies between their life assurance and annuity portfolios.

These practical issues are for a large part responsible for the slow development of a liquid market for survivor swaps, and merit an article in themselves. However, research into these and other mortality-related instruments is ongoing and hopefully before too long market-based solutions for longevity and mortality will find their way into the mainstream. ✱

Editor's Note: A follow up to this article was published in the August 2007 issue of "The Actuary" and can be found online at: www.the-actuary.org.uk/pdfs/07_08_09.pdf

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LIFE TREATY PROJECT UPDATE

by Tim J. Ruark

I have always enjoyed those documentaries on ancient civilizations being ‘discovered.’ Who knew that hundreds of terracotta warriors were buried in China? Or that an early caveman would be found intact, frozen in the ice? Or that Noah’s Ark made it to NYC, only to be turned back because he lacked proper documents? These are wonderful stories of discovery, spanning hundreds and thousands of years.

But what to make of a modern discovery, the reinsurance equivalent of the Dead Sea Scrolls, involving a guide to reinsurance treaty language? [I know, my first paragraph was a trick, you’re actually reading an article about treaty language.] Is the discovery a cause for joy, or only of sadness; after all, the document in question was only written in the ‘90s, how did we lose it so soon? Perhaps most important, can we figure out who had the document last, so we can at least blame somebody for misplacing it? Alright, let me start at the beginning.

This modern saga began October 2006, at a humble Reinsurance Section Hot Breakfast. Thinking we could learn something by surveying our members, we asked each patron what was on their mind. The results were alarming: 26 said they wanted more treaty advice, 12 said we should focus on continuing education, and four wanted ketchup for their hash browns. Your Section leadership sprang into action.

Lots were drawn, teeth were clenched and a scuffle ensued. When the dust settled, yours truly was in charge of getting the Reinsurance section membership some guidance on life treaty wording. Now it was my turn to spring into action, which in volunteer circles, means to write a note, put it in a binder and wait until someone confirms that they’re really interested, then try to remember where you put the note. Fortunately, I put the note on my neighbor’s cocker spaniel, and I saw the note every morning as

their dog watered my lawn. When word returned that this was a valid project, I was ready.

I assembled a fine group of professionals, not just actuaries, but lawyers, underwriters, and other chat-ty people. Our charge was simple—create a document that would provide guidance and commentary on life treaty language. We didn’t seek sample wording, that was already available. Instead, the Section membership had asked for insights, how to understand why certain provisions are used in treaties, the pros and cons of different language, and the things to think about when drafting a treaty.

As I mentioned, sample treaty language is already available, most notably from the ACLI. Some of their professional staff put together sample life treaty language only a few years ago, and in fact, they have sponsored a workshop specifically for treaty language, and I believe they’re thinking about repeating the workshop pretty soon. The ACLI work product goes by the name of the Life Treaty Sourcebook, and all companies with membership to the ACLI should have ready access to this Sourcebook. If you’re not a member company, that doesn’t preclude you from getting your hands on the sample treaty language. You can either contact the ACLI, or perhaps a simpler approach, reference the Third Edition of Life, Health & Annuity Reinsurance, by John Tiller. The Tiller book reproduces the ACLI sample language in its appendix. If you are not pressed for time, you can also scan Tiller’s acknowledgements, where the authors thank the many reinsurance professionals that assisted with the book ... what? They list me? I had no idea!

So, as our project team first met, we made plans for providing commentaries on treaty language, to help novices and experts alike to understand the choices and consequences of various treaty wordings. We divided our volunteers into subgroups, with each



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continued on page 14

subgroup focusing on a specific treaty Article. This is where things got interesting, well at least in a reinsurance kind of way. Using the anonymity of a call-in conference, a strange voice was heard, apparently spouting gibberish. But later, when the tape was played back (you didn't know the SOA records everything?), the voice was very clear: "...an ancient transcript exists...get meds at half off...seek first the ancient text." So, we followed the voice, hoping we could either get the bargain on prescriptions, or some document deemed ancient. We never did find the meds, which is partly why this article might ramble a tad, but we did locate a 100+ page document authored by 20 reinsurance professionals in 1994. And what was this document? Guidance And Commentary On Life Reinsurance Treaties, by each Article!

OUR FOCUS IS LESS ON CREATING NEW COMMENTARIES, AND MORE ON REVIEWING AND ADDING TO WHAT WAS ALREADY PROVIDED.

Of course, the document wasn't truly lost or buried, but knowing what we had, when we questioned people later about the document, maybe one out of 10 knew of its existence. So, this is why I posed the question, should we be happy or sad we made the 'discovery'? Undoubtedly, the discovery is good, because the work product was very thorough and very insightful, and this '94 document now becomes the basis for the current project team to complete our work. Our focus is less on creating new commentaries, and more on reviewing and adding to what was already provided. But the sad part is pretty obvious too. Treaty support really was a prominent concern of our membership at last year's hot breakfast, so we have lots of people looking for guidance, and we have a 100 page document offering guidance, and the two are not getting connected.

So, the Section's plans have not changed, we are still going to provide life treaty support to our membership. But equally important, we realize that with today's technology, we can do our predecessors one better, and make sure that our collective expertise is not only accessible, but also prominent. Our plan is to quickly update some of the '94 document's articles, and get them on our Web site before the end of this year. Then, to frequently remind the membership about our Web site, so that visitors can access not only the life treaty work product, but all sorts of materials relating to risk and reinsurance.

To wrap up, I would like to thank all of the volunteers that are diligently working on the commentaries for the current life treaty project. As always, it's our committed volunteers that determine our success: Paula Boswell-Beier, Ed Attarian, Christine Peloghitis, Connie Dewar, David Elias, Dan Krane, Drew Tindall, Ellen Fedorowicz, Dan Glowski, Jeff Halwes, Larry Carson, Mark Holbrook, Rich Tucker, and Ronnie Klein. Thanks team! ✨

EMPLOYER STOP LOSS INSURANCE CONSIDERATIONS

by Mark R. Troutman

Employer stop loss is an insurance coverage offered to employers who self-fund their employee benefits program pursuant to an ERISA plan document. ERISA requires the plan to have a formal plan document that outlines the medical benefits and administrative protocols to be provided by the self-funded employer. This document essentially replaces a policy that would be issued by an insurance company and ultimately stops the transfer of risk. The self-insured employer becomes responsible for the risk associated with frequency and severity of utilization of employee benefits.

The benefit plan is typically administered by a third party administrator (TPA). The TPA will administer benefits according to the plan document in a non-discriminatory fashion and also arrange for managed care services such as case management utilization review, provider networks and disease management programs. The TPA needs to keep up-to-date on all the latest trends and technology associated with employee benefits (rules and regulations) in addition to complying with all regulatory requirements of operating a TPA.

Two coverages are provided to the employer to mitigate the impact of the medical risk they assumed when they chose to self insure the benefit plan. These are specific stop loss coverage and aggregate stop loss coverage. Specific stop loss coverage protects the employer against the severity of large losses per individual claimant. Aggregate stop loss coverage protects the employer against abnormal frequency of claims in total rather than abnormal severity of a single claim.

Employers choosing a specific deductible should consider expected severity and frequency of "large" claims for their size and for their risk tolerance. A typical employer's capital resources are more limited than those of an insurance company and an HMO, and, therefore, they tend to have lower specific deductibles.

The typical aggregate stop loss coverage provides reimbursement to the employer when actual claims



(excluding those reimbursed by specific stop loss coverage) exceed 125 percent of the group's expected claims. The aggregate protection may include additional coverages beyond medical care including dental, short term disability and vision and hearing. Aggregate benefits are typically capped with an annual maximum (e.g., \$1 million). Specific stop loss benefits are often capped at the maximum in the plan document and ranges from \$1 million up to \$5 million of paid reimbursements per covered person.

This aggregate protection is in contrast to most other medical excess policies or treaties, which normally do not have a component of aggregate protection.

Employer stop loss coverage usually provides reimbursement at 100 percent of all charges in excess of the chosen specific deductible. There are few, if any, internal limits.

Stop loss protection can be arranged on a variety of claim reimbursement bases. Claims eligible for specific stop loss reimbursement may be those incurred and paid within the 12 months of the policy year (referred to as 12/12), incurred within the policy year and paid within 15 months after the effective date of the policy (12/15), or even claims paid within the policy year with some run-in availability given termination from a previous carrier (15/12). Other options may be available upon request as well.

Additional "bells and whistles" may include the following product options:



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continued on page 16

Aggregating Specific Option—The aggregating specific option is a product variation that may be attractive to an employer who is able to assume a fixed amount of additional risk beyond the stated individual's specific stop loss deductible. This fixed amount varies by employer group and is determined during the underwriting process. As with any variation from the normal employer stop loss product, the employer needs to understand the associated risks and rewards. In essence, the aggregating specific amount becomes an additional liability for which the employer is responsible before specific stop loss reimbursements will occur.

The aggregating specific option lowers the rate of the specific premium by creating an additional employer liability pool. This pool is a fixed dollar amount and is in addition to the employer's underlying specific deductible. Once an individual on the employer's plan reaches the underlying specific deductible, the employer will continue to be on the risk for the claims until the total additional employer liability pool has been exhausted.

Once an individual or a combination of individuals has met their specific deductibles and the dollars exceeding the deductibles have exhausted the additional pool, the employer's stop loss carrier reimburses the specific stop loss liabilities.

Specific Advance Funding—The specific advance funding option provides groups with cash flow assistance for specific stop loss claims. This specific advance option is requested in writing at time of quotation and is made a part of the policy via endorsement. Specific advance funding on specific stop loss claims is available to employers for covered expenses when the specific deductible is paid in full by the policyholder prior to any claims being considered for advance funding.

Specific Terminal Liability—The specific terminal liability option provides three months of paid claim run-out protection on the specific stop loss in the event the employer terminates their stop loss policy. The claims must be incurred prior to the end of the policy period to be considered eligible by the stop loss carrier.

The employer must select the specific terminal liability feature at the beginning of the first policy year.

Aggregate Terminal Liability—The aggregate terminal liability options provides three months of paid claim run-out protection on the aggregate in the event that the employer terminates their stop loss policy. The claims must be incurred prior to the end of the policy period to be considered eligible by the stop loss carrier. The employer must select the aggregate terminal liability feature at the beginning of the first policy year. In the event the employer terminates its policy with the stop loss carrier, the aggregate attachment point is adjusted upward by 25 percent, this 25 percent adjustment reflecting the additional 90 days of risk.

Monthly Aggregate Accommodation—The monthly aggregate accommodation is designed to assist smaller self-funded employers with cash flow during the policy period. Instead of reimbursing aggregate claims at the end of the policy year, this product feature will provide a monthly reimbursement in the event the year-to-date paid claims exceed the year-to-date aggregate attachment point. The employer is expected to reimburse the stop loss carrier if in the month subsequent to a monthly payout by the stop loss carrier, the employer's year-to-date paid claims dip below the year-to-date attachment point.

In addition to the usual terms and conditions in a reinsurance and insurance contract, the following are specific items of note for employer stop loss coverage. Also, a coverage specimen is enclosed.

Common Employer Stop Loss Insurance Policy Definitions and Considerations

Aggregate Benefit—The amount that the company agrees to pay the contractholder after the end of the contract period for eligible claims paid by the contractholder as set forth in the schedule and pursuant to the terms, conditions and limitations of the contract.

Aggregate Benefit—The aggregate benefit for the contract period, or fraction thereof, is the total of

the eligible claim payments, on an incurred and/or paid basis as shown in the aggregate contract basis of the schedule:

- a. less the aggregate deductible
- b. less the amount of the claims paid by the contractholder in excess of the maximum eligible claim expense per person as shown in the schedule; and
- c. less amounts recovered from other sources;
- d. multiplied by the aggregate payable percentage.

Aggregate benefits are not payable until after the end of the paid basis shown in the aggregate contract basis of the schedule. If the contract should terminate prior to the end of the contract period, the company shall not be liable for aggregate benefits for expenses incurred or paid by the contractholder after the termination date.

In no event will the aggregate benefit exceed the maximum aggregate benefit shown in the schedule.

Aggregate Contract Basis—Identifies the dates during which employee benefit plan expenses must be incurred and must be paid to be considered eligible for reimbursement as aggregate benefits.

Aggregate Deductible—The sum of each aggregate deductible per month for each month during the contract period or fraction thereof.

Employee Benefit Plan—The formal plan of medical expense benefits, called the plan document, sponsored by the contractholder to provide coverage of plan participants and dependents.

Incurred—Refers to the date on which a covered medical service was rendered, the date disability benefit payments become due, or a covered medical purchase was made for a covered person under the employee benefit plan.

Maximum Aggregate Benefit—The amount set forth in the schedule as the maximum total aggregate benefit payable under the terms, conditions and limitations of the contract during the contract period.

Maximum Eligible Claim Expense Per Person—

As it relates to aggregate coverage, means the maximum dollar value of claims paid on any covered person that can apply toward satisfaction of an aggregate deductible, or that can apply toward the calculation of the aggregate benefit for a contract period.

Maximum Specific Benefit—

The amount set forth in the schedule that is the maximum total specific benefit payable under the terms, conditions and limitations of the contract during an agreement year that an individual is a covered person under the employee benefit plan. Covered expenses for any covered person are limited to the lifetime maximum benefit stated in the plan document.

Paid—

Funds are actually disbursed by the contractholder or his agent. Payment of a claim is the unconditional and direct payment of a claim to a covered person or their health care providers. Payment will be deemed made on the date that both (1) the payor directly tenders payment by mailing (or otherwise delivering) a draft or check, and (2) the account upon which the payment is drawn contains, and continues to contain, sufficient funds to permit the check or draft to be honored.

Should the account upon which payment is drawn not contain sufficient funds to cover all outstanding checks and drafts on the account, then the company may consider, in its sole discretion, any particular checks or drafts as not having been paid, but only to the total amount representing the difference between the funds in the account and the total of outstanding checks and drafts.

Plan Participant—

An employee, a dependent or any other person who is eligible and who is covered under the employee benefit plan. No plan participant may be covered by the contract prior to the date his or her coverage is effective under the employee benefit plan or after the date his or her coverage under the employee benefit plan ends.

Specific Benefit—

The amount the company will pay to the contractholder for eligible claims paid by

continued on page 18

the contractholder over and above the contractholder's specific deductible per person, and pursuant to the terms, conditions and limitations of the contract.

Specific Benefit—The specific benefit with regard to each covered person is the total of the eligible claim payments, on an incurred and/or paid basis as shown in the specific contract basis of the schedule;

- less the specific deductible; and
- less amounts recovered from other sources;
- multiplied by the specific payable percentage.

Specific Contract Basis—Identifies the dates during which employee benefit plan expenses must be incurred and must be paid to be considered eligible for reimbursement as specific benefits.

Specific Deductible—The per covered person deductible as shown in the schedule at the end of this article.

The contractholder shall not be entitled to any specific benefit unless and until the contractholder has actually paid the full amount of the specific deductible as set forth in the schedule for the covered person(s) for which the specific benefit is sought. The

contractholder shall only be entitled to a specific benefit up to the amount actually paid by contractholder over and above the specific deductible.

Responsibilities of the Contractholder's Designated Third Party Administrator

Without waiving any of its rights under the contract, and without making the designated third party administrator a party to the contract, the company agrees to recognize the designated third party administrator as respects the normal administration of the contractholder's plan subject to the third party administrator being responsible on behalf of the contractholder for auditing, calculating and processing all claims eligible under the employee benefit plan within a reasonable period of time, preparing periodic reports as required by the company and maintaining and making available to the company at all times such information as the company may reasonably require for proof of payment of the claims(s) by the contractholder. *

Editor's Note: Specimen schedules can be found on the section Web site at: www.soa.org/files/pdf/employer-stop-loss-ins.pdf.

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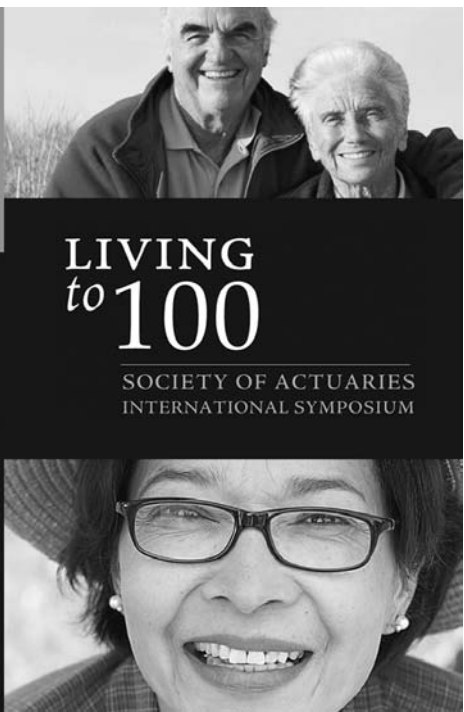
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PROVIDER EXCESS INSURANCE CONTRACT CONSIDERATIONS

by Gregory G. Demars

Provider Excess is an insurance coverage offered to provider organizations that have a capitation agreement with a managed care organization. Provider organizations include hospital systems, physician groups, independent physician associations, physician hospital organizations and integrated delivery systems. The coverage is excess of loss in structure and protects the provider group from significant financial impacts caused by individual catastrophic cases. This article will attempt to educate a purchaser of provider excess insurance on the basic contractual structures and issues that should be considered when negotiating a contract.

Certainly key in any insurance coverage purchase is to first understand and determine what is going to be covered (covered services) and at what benefit levels. Concerning covered services, each provider group taking capitation has within its capitation agreement with the MCO, a Division of Financial Responsibility (DOFR). This matrix lists all medical services and supplies the MCO offers to its members and for each it declares whether the MCO or the provider group is financially responsible, or at risk. This document outlines each service/supply the provider group has committed to providing the membership of the MCO in exchange for a monthly capitation. An example of this is available on the section Web site. The DOFR document thereby drives much of the covered services discussion with an insurance carrier.

Like HMO reinsurance, a provider may choose to only insure a subset of total medical costs they are at risk for, targeting the drivers of catastrophic exposures. Usually the provider seeks coverage for all of the services and supplies they are at risk for per the DOFR. Due to this reliance on the DOFR to define the covered services of the provider excess contract, there must be significant rigor put forth in making this clear to all parties involved. Certain insurance carriers attach this DOFR to the provider excess policy and others translate the DOFR to a higher level risk matrix to be used within the provider



excess policy. The purpose of the translation or additional rigor is to take an additional step at time of purchase to make certain it is clear as to what the covered services are to avoid issues later.

The provider group may have many capitation agreements from multiple MCOs for multiple membership types. Membership types include commercial, Medicare and Medicaid lives with each often having unique DOFR's from the same MCO. Again it is critical that all are understood and clear in defining the covered services under the provider excess policy.

Benefit level considerations such as selecting deductible, covered services and coverage options should also include reviewing and monitoring changes in the following:

- Frequency and severity of historical claims at various deductible levels
- Risk profile of provider membership—size, type (Medicare, Medicaid or Commercial)

continued on page 20

- Risk tolerance and budget considerations of the provider group
- Risk mitigation mechanisms
 - o Provider contract structures
 - o Medical management and claim management programs
- Underwriting margin and results
- Financial strength and/or parent support
- Provider group mission and goals

Similar to HMO reinsurance, coverage options include deductible level, coinsurance, average daily maximums and limitations on specific services to name a few. These are tools that allow the purchaser the ability to balance the cost of the coverage with their organization's risk tolerance.

The remainder of this paper is a listing of terms and provisions commonly found in a provider excess policy with a general meaning for the term and typical parameters seen in the market. This information is not intended to provide a precise legal definition of each provision, but a general understanding.

First are common subsets of medical services and supplies defined in the policies that if desired may have unique coverage options or limitations relating to each:

Acute Care—A subset of medically necessary services where a member is a registered inpatient in a hospital, receiving care under the supervision of a physician and the care is not solely for rehabilitation.

Outpatient Care—Services and supplies provided to a member who is not a registered inpatient in a hospital.

Custodial Care—Services and supplies which are maintenance or to mainly assist in the activities of daily living.

Sub Acute Care—A subset of medical services and supplies where the care is primarily rehabilitative or restorative in nature.

Professional Care—Services and supplies provided by a health care professional which are not provided in a home setting.

The insuring clause of the policy generally states that the insurer will cover the coinsurance percentage multiplied by loss in excess of the deductible up to the policy maximum subject to any limitations. Following are brief summaries of these and other common benefit schedule terms and options.

Average Daily Maximum—A limitation on the average hospital inpatient expense per day that is covered under the policy. The average may be calculated for each period of continuous confinement or may be calculated over the entire provider year. These generally range from \$2,000 to \$6,000, but in some situations are unlimited. When part of the policy, it provides an incentive for the provider to negotiate strong provider contracts and bring care back into network when care is in a nonparticipating facility.

Coinsurance—The percentage of eligible benefits paid by the insurance carrier in excess of the deductible. Standard coinsurance is 90 percent.

Deductible—The amount of the loss incurred retained by the provider. These range from \$10,000 to \$75,000 for physician based coverage and \$50,000 to \$1,000,000 for hospital and comprehensive coverage.

Eligible Benefits—The medical services and supplies for which the insurance carrier has agreed to provide coverage under the terms of the policy.

Incurred—The date the service or supply is rendered or furnished by a provider.

Liability Period—The period for which claims must be incurred followed by the period in which

the claims must be both paid and submitted to the insurance carrier to be eligible for reimbursement. Common in the market is 12/18 coverage which means claims incurred during the 12-month coverage period and paid and submitted within six months after the end of the coverage period.

Loss—The amount of eligible benefits incurred subject to any applicable limitations or exclusions.

Maximum Benefits—The limit on the amount of total payment per claim which will be paid under the policy. These are often \$1 million to \$5 million per covered life per year or lifetime.

Run In—The loss incurred during a certain number of days immediately preceding the effective date of the provider's coverage with the current insurance carrier where such loss was not covered under the previous insurance carrier's Policy.

Run Out or Carryforward—The loss incurred during a certain number of days (e.g., 30-60 normally) at the end of the current policy period for which the deductible is not satisfied will be treated as if incurred during the next policy period.

Scheduled Provider Contracts—The provider may supply the insurance carrier with a written description of the financial terms of a hospital or physician contract and those terms are incorporated into the policy. Claims incurring expense at these providers will be held to the scheduled amounts included in the policy.

Other miscellaneous provisions include the following:

Exclusions & Limitations—Typical exclusions and limitations may include the following:

- Experimental procedures
- Expenses due to act of war
- Expenses payable from any other source

- Expenses not covered under the policy or underlying capitation agreement

- Expenses in excess of reasonable and customary charges

Experience Refund—This is an optional provision used to allow the provider a chance to participate partially in the experience of the policy if the provider excess experience is favorable.

Material Change—A change which requires notification and may result in exclusions of coverage, the termination of the policy or an increase in the premium. Significant changes in membership, ownership or provider contractual charge levels are common triggers for this provision.

Premium Provision—Premium is generally collected on a per member per month basis and is due on the first day of each month with a grace period of 30 days.

Notice of Claim—A requirement for the provider to report claims to the insurance carrier that either have a certain diagnosis or which reach a certain percentage of the provider's deductible.

Offset—The right of the provider or the insurance carrier to apply amounts owed by one party against amounts owed by the other party.

Reasonable and Customary—The charges for health care services which do not exceed the typical charge accepted by the majority of like providers in the same geographical area for the same or similar services.

Service Standards—The policy may include service standards for a policy and amendment issuance, claim payment accuracy and processing time. ✱

Editor's Note: An example of the DOFR document can be found on the section Web site at www.soa.org/files/pdf/excess-insurance.pdf.



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REINSURERS AND DIRECT WRITERS: COMPARATIVE RESULTS FROM THE RECENT SOA MORTALITY TABLE STRUCTURE SURVEY

by Mark Swanson



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In July 2007 the SOA published the Report of the Society of Actuaries Mortality Table Construction Survey Subcommittee (henceforth, the Report). I was a coauthor of this Report. The survey had 64 respondents: 53 direct writers and 11 reinsurers.¹ This provided a rich dataset that we could not exhaust in our published report and still produce it in a timely fashion. In particular, we did not do separate analysis for direct writers and reinsurers, which could be of particular interest to readers of Reinsurance News.² The goal of this article is to provide additional analysis based on this distinction among survey respondents.

Before we begin, let me point out that unlike the Report (available at soa.org/research), this article is an individual effort, a summary of my own observations related to the survey data.

Underlying Table

The survey asked what the predominant product (directly issued or reinsured as the case may be) was for new sales in 2006 (Table 1).

Product	% of Reinsurers	% of Direct
Level Premium Term	55%	56%
Universal Life / Variable Universal Life	18%	20%
Universal life with secondary guarantees	18%	6%
Whole life	0%	10%
Other	9%	8%
Respondents	11	50

Mortality Table	% of Reinsurers	% of Direct
Society of Actuaries 1975-80 Basic Table	55%	42%
2001 Valuation Basic Table	36%	32%
Own company's experience	18%	14%
Society of Actuaries 1990-95 Basic Table	0%	8%
Society of Actuaries 1985-90 Basic Table	0%	4%
2001 CSO	0%	2%
Other	18%	2%
Respondents	11	50

The only significant difference between reinsurers and direct writers was that whole life was not predominant for any of the reinsurers.

Reason	% of Reinsurers	% of Direct
Best reflects our business	73%	38%
Relationship of select to ultimate mortality best reflects anticipated future experience	36%	24%
Maintains continuity with prior pricing assumptions	18%	50%
Consistent with reinsurers/retrocessionaires' experience	18%	40%
Consistent with ceding companies' experience	18%	0%
Consistent with what other companies are doing	9%	8%
Recommended by consultant	9%	2%
Most up to date industry table	0%	4%
Other	27%	8%
Respondents	11	50

Respondents were directed to answer the remaining questions in the survey based on this predominant product.

The survey asked which mortality table was used as the underlying basis for the company's pricing assumption, and why that table was chosen. Some respondents gave more than one answer (Table 2).

There is broad agreement between the two groups—the '75-'80 Table is most popular, followed by the 2001 VBT. However, 14 percent of direct writers reported using one of the '85-'90, '90-'95 Basic Tables or the 2001 CSO, none of which were used by the reinsurers. The "other" responses

included the Tillinghast Older Age Mortality Study and the Bragg tables.

Direct writers seemed to place more emphasis on continuity with prior assumptions and consistency with their reinsurers, while reinsurers were in strong agreement that the selected table best reflected their business. The “other” reasons offered had to do with specific advantages of the table selected (Table 3).

Modifications to Underlying Table

The survey asked which modifications to the underlying table the company uses in determining the final pricing mortality table (Table 4).

Modification	% of Reinsurers	% of Direct
Risk class	91%	96%
Update experience to current pricing period	91%	46%
Smoking status	82%	82%
Policy size	82%	58%
Sex	64%	68%
Policy duration	55%	72%
Age	55%	70%
Target market	45%	10%
Distribution channel	36%	6%
Conversions from term to permanent	18%	14%
Differences during and after the contestable period	9%	6%
Reclassification of smokers to nonsmokers	9%	0%
Other	45%	16%
Respondents	11	50

Risk class was the most common answer given by both reinsurers and direct companies. Smoking status and sex also ranked relatively high for both groups. The most significant differences were that

reinsurers favored modifying the table based on four factors that were less favored by direct companies.

Those were:

- Policy size,
- Updating experience to current era,
- Target market, and
- Distribution channel.

“Other” items listed by the reinsurers related mainly to varying the table for individual characteristics of the ceding company.

Source	% of Reinsurers	% of Direct
Our own mortality experience	91%	78%
Industry studies	91%	52%
Consultants	36%	32%
Ceding company experience	36%	0%
Reinsurers	18%	68%
Respondents	11	50

Respondents were asked to select any of the given sources of information that they used to make these modifications (Table 5).

Note the significant difference in reliance on industry studies, as well as the difference in reliance on reinsurers/retrocessionaires. Reinsurers’ comparatively low reliance on their own retrocessionaires makes sense: retrocessionaires’ business is almost exclusively excess of reinsurers’ already relatively high retention limits and that means that retros’ portfolios can be expected to be quite different in nature than reinsurers’ portfolios.

With the exception of the reinsurer/retrocessionaires item, the reinsurers as a group were more likely to use every source of information listed in the survey, perhaps a sign of the thoroughness one might expect from their industry.

Frequency	% of Reinsurers	% of Direct
More frequently than annually	18%	6%
Annually	55%	43%
Every 2 to 3 years	18%	20%
When new products are developed	9%	27%
Other	0%	4%
Respondents	11	49

The survey asked how frequently these modifications to the underlying table were reviewed (Table 6).

The results showed that 73% of reinsurers reviewed their modifications annually or more frequently versus 49% of direct writers.

continued on page 24

Select Period

Respondents were asked to provide the length of the select period of their company's pricing mortality table for issue ages 25, 50 and 75 (Table 7).

The direct writers as a group reported using slightly longer select periods than reinsurers. This is somewhat surprising, since reinsurers might be expected to take the more aggressive stance on how long selection might last.

Mortality Ratios³

The survey requested mortality rates for issue ages 25, 50 and 75 at various durations, as well as for various attained ages from 25 to 105. The goal was to calculate:

Select Period	% of Reinsurers			% of Direct		
	Issue Age 25	Issue Age 50	Issue Age 75	Issue Age 25	Issue Age 50	Issue Age 75
< 15 years	0%	0%	9%	4%	4%	9%
15 years	36%	27%	36%	34%	32%	27%
20 years	18%	9%	18%	4%	2%	18%
25 years	45%	55%	27%	40%	44%	39%
30 years	0%	0%	0%	6%	6%	5%
50 years	0%	0%	0%	4%	10%	0%
70 years	0%	0%	0%	6%	0%	0%
> 70 years	0%	0%	0%	2%	0%	0%
Other	0%	9%	9%	2%	2%	2%
Median	20	25	18	25	25	20
Respondents	11	11	11	50	50	44

- *Select to Ultimate Ratios:* The relative power of selection on mortality and how quickly selection wears off by policy year, ($q_{[x]+t} / q_{x+t}$, where $q_{[x]+t}$ = mortality rate for issue age x at duration t and q_{x+t} = ultimate mortality rate at attained age $x + t$).
- *Best Preferred Class to Residual Class Ratios:* The relative mortality of preferred risks and the extent to which the state of being a preferred risk persists by policy year ($q^P_{[x]+t} / q^R_{[x]+t}$, where P = preferred, R = residual standard).

In the tables that follow, I have chosen the median response as the single most valuable summary statistic of the responses as a whole.⁴

Select to Ultimate Ratios

Certain respondents provided only partial responses to the request for mortality rates. As a result, the number of responses varied from cell to cell. The number of responses contributing to the medians below ranged from seven to nine reinsurers, and from 28 to 40 direct writers (Tables 8-13).

The Select to Ultimate ratios for age 50, best preferred are very consistent between the reinsurers and the direct writers. However, the reinsurers take a more aggressive view of the power of selection at age 25, especially between durations six and 11, while the direct writers take a more aggressive view of the power of selection for 75-year-olds, at least for the first 11 durations. It's also interesting that reinsurers and direct writers tend to agree that selection is gone after 20 years for age 25 and age 75 issues, while for issue age 50 some selection persists beyond 20 years.

For the residual standard class, the same general pattern applies, with reinsurers more confident in the power of selection for age 25 and the direct writers more confident for age 75. For age 50, the reinsurers seem to take a slightly dimmer view of the power of selection than the direct writers.

	Duration					
	1	6	11	16	21	26
Reinsurers	45%	58%	71%	95%	100%	100%
Direct	46%	66%	80%	100%	100%	100%

	Duration					
	1	6	11	16	21	26
Reinsurers	33%	60%	72%	88%	94%	100%
Direct	33%	59%	72%	88%	90%	100%

	Duration					
	1	6	11	16	21	26
Reinsurers	32%	61%	73%	91%	100%	100%
Direct	25%	49%	65%	92%	100%	100%

	Duration					
	1	6	11	16	21	26
Reinsurers	48%	63%	81%	99%	100%	100%
Direct	53%	67%	82%	100%	100%	100%

	Duration					
	1	6	11	16	21	26
Reinsurers	37%	67%	78%	98%	100%	100%
Direct	38%	63%	78%	92%	97%	100%

	Duration					
	1	6	11	16	21	26
Reinsurers	33%	69%	86%	93%	100%	100%
Direct	30%	53%	72%	97%	100%	100%

For issue age 50, the same relationship holds, with reinsurers assuming more persistence of preferred than direct writers, though the difference is not as dramatic as at age 25.

For issue age 75, the reinsurers saw preferred persisting for the first 11 durations and wearing off fairly quickly thereafter. While the direct companies saw about the same or a little more aggregate wearing off over 26 years, they

saw it wearing off more consistently over the 26 year time frame.

Best Preferred to Residual Standard Ratio

There are two things being measured with this ratio. First, the magnitude of the ratio indicates the assumed amount of mortality savings due to the more restrictive selection process for preferred risks. Secondly, the upward drift of this ratio as duration increases measures the “wearing off” of the preferred nature of the risk. To focus on this wearing off, I’ve computed the mortality discount implied by the median, which is simply 100 percent minus the median preferred to standard ratio, and the relative change in this implied discount as the duration increases (Tables 14-16).

	Duration					
	1	6	11	16	21	26
Reinsurers						
Median	55%	56%	57%	58%	60%	62%
Implied discount	45%	44%	43%	42%	40%	38%
Relative change	100%	98%	96%	93%	89%	84%
Respondents						
Direct						
Median	53%	55%	56%	60%	61%	67%
Implied discount	47%	45%	44%	40%	39%	33%
Relative change	100%	96%	94%	85%	83%	70%
Respondents						

	Duration					
	1	6	11	16	21	26
Reinsurers						
Median	57%	57%	57%	57%	58%	59%
Implied discount	43%	43%	43%	43%	42%	41%
Relative change	100%	100%	100%	100%	98%	95%
Respondents						
Direct						
Median	55%	56%	58%	60%	61%	65%
Implied discount	45%	44%	42%	40%	39%	35%
Relative change	100%	98%	93%	89%	87%	78%
Respondents						

For issue age 25, reinsurers clearly expect little preferred to wear off over the first 26 years (drift from 57 percent to 59 percent) while direct writers as a group see a stronger upward trend (from 55 percent to 65 percent), a wearing off of about 22 percent in relative terms.

similar to the “implied discount” and “relative change” above. I encourage the reader interested in further investigation to find this report at soa.org/research.

In September 2007, the Futurism Section, the Committee on Knowledge Extension Research and the Committee on Life Insurance Research published a report titled “Persistence of Individual Mortality Risk Differentials Utilizing A Modified Online Predictive Market.” This project used innovative techniques to study the persistency of preferred as measured using quantities

continued on page 26

	Duration					
	1	6	11	16	21	26
Reinsurers						
Median	58%	59%	59%	62%	71%	80%
Implied discount	42%	41%	41%	38%	29%	20%
Relative change	100%	98%	98%	90%	69%	48%
Respondents	11					
Direct						
Median	54%	58%	61%	65%	73%	80%
Implied discount	46%	42%	39%	35%	27%	20%
Relative change	100%	91%	85%	76%	59%	43%
Respondents	37					

Mortality Improvement

The survey asked whether respondents modified their pricing mortality tables to make explicit adjustments for future mortality improvements. The survey went on to ask those who responded positively to state how many policy years of improvement are assumed for issue ages 25, 50 and 75, male nonsmoker best class (Table 18).

	% of Reinsurers	% of Direct
Yes	100%	28%
No	0%	72%
Respondents	11	50

There is a difference of opinion with respect to using future mortality improvements in pricing. Assuming future mortality improvements is much less common among direct writers than among reinsurers—in fact, every

Years	Reinsurers			Direct		
	Issue Age 25	Issue Age 50	Issue Age 75	Issue Age 25	Issue Age 50	Issue Age 75
0	18%	0%	9%	0%	0%	0%
5	0%	0%	9%	0%	0%	0%
10	18%	18%	18%	21%	21%	33%
15	18%	36%	18%	14%	14%	25%
20	27%	27%	27%	36%	36%	17%
25	0%	0%	9%	7%	7%	25%
30	18%	18%	9%	7%	7%	0%
50	0%	0%	0%	0%	7%	0%
75/Lifetime	0%	0%	0%	14%	7%	0%
Median	15	15	15	20	20	15
Respondents	11	11	11	14	14	12

reinsurer reported that they assume future mortality improvements in pricing. However, among those direct writers who do assume future mortality improvements, a somewhat more aggressive stand is taken, with improvements assumed to persist for a longer time at every age.

After asking how long improvements were assumed to persist, the survey asked for the specific annual improvement factor for male nonsmoker best class, issue age 50 (Table 19).

	Duration						
	1	5	6	10	11	20	21
Reinsurers	0.8%	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%
Respondents	11						
Direct	1.0%	1.0%	1.0%	1.0%	1.0%	0.6%	0.0%
Respondents	13						

There is only slight evidence that those direct writers who assume future mortality improvements take a somewhat more aggressive position on the magnitude of the annual improvement.

Finally, the survey asked how often the company's assumption as to future mortality improvement assumption is reviewed for possible adjustment.

Frequency	% of Reinsurers	% of Direct
More frequently than annually	0%	0%
Annually	45%	20%
Every 2 to 3 years	45%	40%
Less frequently than every 3 years	0%	7%
When new products are developed	0%	27%
Other	9%	7%
Respondents	11	15

Reinsurers appear to review their mortality improvement assumption somewhat more frequently.

Conclusions

Please keep in mind that any conclusions are limited by the sample size. This is especially the case with respect to the direct writers. For the reinsurers, while the total number of survey respondents is small, they represent a substantial portion of their industry. Of course, any conclusions are also limited by the accuracy of the answers to the survey questions and of the interpretations of survey questions made

by respondents. Keeping these limitations in mind, some conclusions worth noting include:

- Reinsurers and direct writers both use the SOA '75-'80 Table and 2001 VBT most commonly.
- Direct writers made somewhat fewer modifications to their underlying table and the modifications they made were more likely to be based on consistency with past assumptions and consistency with their reinsurers. Reinsurers seemed to customize their tables more to the specific ceding company, and tended to use industry studies and their own experience to make these modifications.
- Direct writers used slightly longer select periods in their pricing mortality tables than reinsurers.
- Reinsurers assumed more power of selection than direct writers at age 25, while the direct writers

assumed more power of selection than reinsurers at age 75.

- When it came to the persistence of the mortality advantage of preferred risks, reinsurers believed that preferred would wear off more slowly than the direct writers tended to believe.
- Every reinsurer reported assuming future mortality improvements in pricing, while a clear minority of direct company respondents reported doing so.

Some of these conclusions might be considered surprising, especially if one assumes that reinsurers are more aggressive than direct writers. On the whole, this might be true, but the survey data have revealed a more ambiguous picture than one might have expected. ✱

¹ The Report stated that 10 of the 64 respondents were reinsurers. Eleven is the correct number.

² The differences between the published Report and this article are as follows.

a) For analysis of Select to Ultimate ratios, Select Grading ratios and Preferred to Residual ratios, the Committee used only responses from those respondents reporting either a 15-year select period or a 25-year select period. There were between 14 and 18 respondents for the 15-year case (depending on age) and between 17 and 23 respondents for the 25-year case. Responses from those reporting some other select period were not analyzed. In the present article, all respondents are included regardless of select period. This increases the effective number of respondents by about 10, depending on cell.

b) The ratio analysis was done separately for the 15-year and 25-year cases. Direct writers and reinsurers were not analyzed separately. In the present article, the analysis was done by reinsurer vs. direct, instead of by reported select period.

c) There was comparatively little editing of responses in the Report, even when responses seemed not to correctly interpret the question in the survey. By contrast, such responses in the present article have been carefully edited. When select rates reported were higher than ultimate rates for the same attained age, the resulting ratio was capped at 100 percent. Furthermore, if a company priced on a pure ultimate basis for a given cell, their responses were not included in the analysis of Select to Ultimate Ratios for that cell. Finally, the respondent's indicated select period was overridden if the mortality rates provided indicated another select period. The de facto select period was assumed to be true.

³ The Report also contains an analysis of the Select Grading Ratio, which is the ratio of a given select mortality rate to the mortality rate at the end of that row of the mortality table. In this article, I have skipped an analysis of these ratios, preferring instead to concentrate on Select to Ultimate Ratios and Preferred to Residual ratios.

⁴ If one is trying to measure an underlying random process, mean may be more useful because it is the expected value's unbiased estimator. However, in this case we are not trying to estimate some underlying "true" value; rather, we are trying to gauge a consensus of opinions, and the median is preferable because of its lesser sensitivity to outliers, especially considering the relatively small sample sizes we have in this survey.

OPTIONS FOR ACTUARIES

by Michael Frank



With the continuing merger of the insurance industry and capital markets, actuaries have been given more options. Actually in this case, these options are new opportunities for actuaries pricing financial instruments such as “options” for the capital markets. With the potential growth in the premium finance and life settlement industry, private equity and hedge funds are exploring ways to be involved in this market. One area is providing options to the industry. This has opened a door for actuaries to use their expertise to help price options for the capital markets.

Before diving into this topic, we may want to define several terms. First, what is an option? An option is a right, typically contractual, to purchase or sell something (e.g., stock) at a future time or within a specified period at a specific price.

A life settlement occurs when an unwanted life insurance policy is sold rather than lapsed or surrendered. Upon completing a life settlement transaction, the policyholder receives an amount significantly greater than their cash surrender value. The covered insured is the same as before. However, the policy owner and the beneficiaries will most likely change, usually to the life settlement company buying the policy.

The buyers of life settlements structure the underwriting box to reflect individuals that were senior cit-

izens (over age 65) with large policies (\$250,000 or above) and low to moderate life expectancies (between two and 10 years). With a growing senior population owning insurance policies, there is a potential for a large number of policies to be settled.

Premium financing is the financing of insurance policies with a low down payment and low monthly payments. The policyowner is traditionally not subject to a credit check. The only requirement is that the customer is being sold a valid insurance policy that qualifies for financing. This concept is common in the property casualty insurance environment with companies financing premium payments for coverages such as Errors & Omissions/Professional Liability. Insurance companies want an upfront annual payment while the policy owner or insured would like to finance over the year, so this is handled through a premium finance company.

This industry has evolved and expanded into the life insurance field, where insureds purchase insurance and fully finance premium for the first two to three years of the policy. The policyholder then pays back the loan with interest, or chooses not to pay back the loan and policy ownership transfers to the premium financing company. This is known as non-recourse premium financing and is becoming more popular. In some cases, premium finance companies provide a payment to the policyholder if they elect not to keep the policy. There are many hybrids developing, but the above example is typical.

The period before policy transfers to the premium finance company is usually set at two to three years, since this is consistent with the incontestability clause for the insurance policy. Then the policy transfer or the underlying circumstances under which the policy was purchased cannot be contested or rescinded, even if a fraud was potentially committed such as lying on the application. The transfer of the policy to the premium finance company is in essence a life settlement. There is a significant debate pertaining to premium financing since it results in the “manufacturing” of new policies that might not have been purchased, plus it opens up issues of interpretation of insurable interest, incon-



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restability and underwriting practices around premium financing.

Regardless, there is a growing demand for investments in life settlements and premium financing with the perception that the life settlement industry makes significant returns. Little imputed data is available in the market to determine whether or not this perception is reality. Life settlement companies and investment bankers have modeled portfolios to show significant returns. In the past, many used reinsurance coverage, actually life extension risk coverages, to ensure meeting that return on investment (ROI).

One important point is that success in the life settlements industry is driven by the ability to predict mortality and price policies accordingly. These companies are taking on life extension risk or finding partners (e.g., investors, risk takers, etc.) to assume this function.

Life extension risk is the risk of setting life expectancy projections too low, resulting in longer and greater payouts in premium (additional cost to life settlement providers) as well as delay in receiving life insurance benefits (revenue to life settlement providers). Remember, a life settlement company's revenue comes from the death of an insured (maturity of a policy) since the company is the beneficiary, while their expenses include the cost of paying premium plus other costs for managing the business. The longer an insured lives, the more premium is paid and the less, or later, death claims are paid.

How is this risk mitigated? Prior to 2003, reinsurance was commonly used to limit volatility risk, in particular for smaller life settlement portfolios, since the downside exposure was set to a maximum life expectancy for each policy. This protected the life settlement company from the risk of insureds living too long and helped the company meet its ROI objectives. The reinsurance was a stop-loss policy whereby the life settlement provider paid an upfront premium, a percentage of benefit (face) amount, and then received the face amount payable at some pre-defined duration, typically the projected life expectancy plus two years, if the policy was still in force. The reinsurer would then become the policy

owner, collecting future benefits/maturities and paying future premiums.

The primary writer of this reinsurance exited the market in the fall of 2003. Therefore, many of the current providers are using other means for managing their exposure, for example revised underwriting guidelines. Others have purchased surety bonds (sometimes referred to as "death bonds" since guaranteeing maturity), while many have just retained life extension risk. A newer approach is the use of options.

WITH FEW ORGANIZATIONS WILLING TO ENTER THE MARKET OFFERING REINSURANCE, RISK MANAGEMENT IS BEING EXPLORED THROUGH ALTERNATIVE MEANS SUCH AS THE USE OF OPTIONS.

New Evolution of Options

With few organizations willing to enter the market offering reinsurance, risk management is being explored through alternative means such as the use of options. These options are not being underwritten by insurance companies or reinsurers, but rather by the capital markets and in many cases through hedge funds and private equity firms. Sellers of these options feel they can meet profits and provide a solution for a product with high demand. Buyers of these options feel this is a way to ensure meeting returns and mitigating risk.

Methodologies used for pricing options are similar to those used by actuaries today for premium development and reserve valuation for life insurance. These include selection of mortality tables, interest rate discounts, expense margins and projected profit returns. Actuaries may be using commutation functions or life contingency functions such as A's, a's, V's, px's, qx's and many other actuarial formulas.

Challenges of Options

There are several key questions that will need to be addressed when developing pricing for an option.

continued on page 30

First, what is the actual option providing? For example, is the option payout price a pre-set number or does it have a “lookback” provision whereby price is not determined until the option is actually exercised.

If the price is pre-set with rights to exercise during a specified time period, then this is referred to as a “put” option. The greater the value of the pre-set price, the more the cost of the option. There may be much debate between the buyer and seller on whether the pre-set price is greater than or less than the price projected to be in the market.

Next, who is guaranteeing the option? If not an insurance company, then is it being securitized and how? This becomes important since the underwriter of these options might form a NewCo, a company formed for the sole purpose of writing these types of risks.

It is important to understand how the risk will be financially guaranteed and risk becomes greater with the greater duration of the option exercise date. The more requirements for the option underwriter to provide guarantees or securitize the risk that they are offering the buyer, the higher the potential risk charges (premium) for the option or the lower the benefits.

Another key question is whether medical underwriting will be involved. Medical underwriting exists today in the life settlement market and is a key driver to the success and failure of life settlement risk takers. Medical underwriting is used for projecting life expectancy and durations that policies will be in force. As a result, options may incorporate a component of medical underwriting. Will options have medical underwriting and will they be based on insurance company original underwriting at time of policy issuance or done by a third party underwriter at some other date in time?

Do policies have to be transferable (does underwriter of option own the policy) or do they solely provide financial relief and the policy lapses or is maintained by the policyholder (they solely get a

benefit)? This will influence the pricing because of the risk components, administrative costs (if underwriter assumes policyholder responsibility), and licensing (and financial requirements along with licensing) for maintaining policies.

Once past the above items, the actuary or underwriter is faced with determining the appropriate assumptions to use, such as discount rate and mortality table, along with percentage discount or load to that table. This leads into the next question: whether premium or option benefit amounts are fixed or vary by age and duration. Other assumptions will be required as well, such as administrative expenses/overhead, loan facility costs (if borrowing money), underwriting fees, capital requirements, profit margins/ROI, etc.

There are many moving parts, so it is important that the actuary or underwriter pricing options make sure that they understand what these parts are and document calculations, provisions and assumptions accordingly. The buyers and sellers of these options are not traditionally insurance companies and their contractual arrangements and policies may not have the same rigor that a traditional insurance policy would have. As a result, it is important for the actuary to document assumptions appropriately since their work product could be subject to interpretation and scrutiny in the future.

If you, as an actuary, have a contract to provide consulting services to a NewCo, it is important to make sure they have the financials to pay your fees and meet any contractual obligations that they promise. Will the NewCo have a parental guarantee or some entity step in that is financially viable if they cannot meet their obligations?

It may also make sense to make sure you have a physical “contract” which outlines what is being done, so you and your client are on the same page on what components are being priced into the option. Remember, you are not dealing with traditional insurance people anymore, so the rules of engagement will be very different and terminology may differ as well. ✱

ACTUARY TAKES ON ALL CHALLENGERS TO WIN IQ SHOWDOWN

by Tom F. O'Sullivan

Tom O'Sullivan, vice president and actuary, Canada Life, Reinsurance Division and vice president and chief actuary of the London Reinsurance Group took on all challengers to win the Test the Nation IQ Showdown on the Canadian Broadcasting Company (CBC) on March 18, 2007. The format was unique as it pitted six diverse teams of 36 against each other together with a smaller team of eight celebrities. The CBC did an excellent job of creating the groups with Radio DJs, Tattoo Artists, Surgeons, Millionaires, Fitness Instructors and Mayors who all came dressed for their parts.

Tom was tested even before the IQ Showdown as he had to find a team he could join that met his characteristics. Mayors were out as he didn't look good with a "chain of office." Fitness Instructors were a possibility until he was told he needed to wear tight clothing. Surgeons were a no-go as he didn't want to ruin his hair with the scrubs. Radio DJs either got up too early or worked all night. He is afraid of needles so he couldn't be on the tattoo artists' team. His only choice was the millionaires. However, if he liquidated all his possessions obtained during the 27 years of his actuarial career he could scrape up about \$100,000. In the end, the millionaires were it as he told the contest's producer that he could "dress like a million bucks" and they were desperate as someone just dropped out.

The IQ test of 60 questions was created by a university professor and allowed for 10 to 20 seconds to answer each question on math, memory, language, logic and perception. The Surgeons started strong with a 6 percent lead on the Millionaires, but at the halfway point their lead was shaved to 2 percent. On the individual side, O'Sullivan was in a neck and neck battle with Toronto's Mayor David Miller who is a Harvard graduate and a Rhodes Scholar. Even though O'Sullivan was secretly hoping the next set of questions would be on "Fair Value Accounting," he got his second choice as the math questions followed and he ended up the overall winner with an IQ of 137 (56 out of 60). Tom was



happy to have finally proved without a doubt the answer to the age old question: FSA > (Harvard + Rhodes)!

In the team competition, the surgeons edged out the millionaires 119 to 118 and everyone seemed to be happy that those who perform surgeries are the smartest on average! The fitness instructors finished third followed by the mayors, radio DJs, tattoo artists and celebrities.

Tom was a bit of a celebrity himself back at the office, but was quickly humbled as one of his bosses let everyone know that, "we had to be careful that we didn't rub it in the competition's face so we chose someone who would win ... but just barely!" In addition, Tom has been told that he will now lose a point from his IQ for every mistake he makes over the next three months. I am happy to report that Tom is now giving 25 percent discounts to actuaries at his new tattoo parlor!

If you missed the show and think you can beat Tom's IQ you can try the test at <http://www.cbc.ca/testthenation/episodes/iq/take-the-test/ttn-iq.html> *



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