

RECORD OF SOCIETY OF ACTUARIES 1991 VOL. 17 NO. 4A

MANDATED RISK-BASED SURPLUS

Moderator: MICHAEL J. COWELL
Panelists: DENNIS P. LAUZON
OWEN A. REED
MICHAEL L. ZURCHER
Recorder: FREDERICK J. YOSUA

The National Association of Insurance Commissioners (NAIC) is actively pursuing the development of a risk-based capital requirement as a recommended replacement for small, fixed-dollar requirements prevailing in many states. The Canadian Life and Health Insurance Association (CLHIA) has already developed Minimum Continuing Capital and Surplus Requirements (MCCSR).

- History of risk-based surplus
 - Recent actuarial literature
 - Canada: MCCSR
 - U.S.: Minnesota, New York, other state requirements
 - Rating agencies
 - Bank and international requirements
- Impetus for change
- Regulatory activity
 - Canada: CLHIA and Compensation Corporation
 - U.S.: NAIC Risk-based Capital Working Group
- Limitations and difficulties of mandated industrywide formulas
- Outlook

MR. MICHAEL J. COWELL: I am corporate actuary and I have the responsibility, along with our recorder, Fred Yosua, for UNUM's risk-based capital. Our other panelists are Dennis Lauzon, Michael Zurcher and Owen Reed. Dennis is vice president and actuary with Mass Mutual. He spent nine years managing GIC products and the last five managing the Corporate Actuarial Department at Mass Mutual. Among Dennis' other duties, he's responsible for reviewing pricing, reserving, and capital requirements for his company's products.

Mike Zurcher is second vice-president and associate corporate actuary at Lincoln National. Mike has Lincoln's Corporate Actuarial Department among his responsibilities. The Corporate Actuarial Department is maintaining Lincoln's risk-based capital formula. Mike is author of an article in a recent issue of the *Lincoln National Reinsurance Reporter* on Lincoln's target surplus formula.

Our Canadian representative is Owen Reed. Owen is vice president and actuary in the corporate area of Sun Life. Much of his work deals with financial reporting matters and under his direction Sun Life has made fairly extensive use of projected cash-flow models, valuation profitability, and risk-analysis work. Because Sun Life is a large, multinational company with diversified lines of business, Owen is familiar with statutory financial reporting requirements and their major strengths and weaknesses in several countries, including the United Kingdom, the U.S., as well as Canada.

Let me begin with a few remarks about the recent history of risk-based capital (RBC), the actuarial work that's been done, and some of the impetus to change in our

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perspective on this issue. Like so many topics being discussed at this annual meeting, risk-based capital and the closely related issue of solvency would not likely have appeared as recently as a decade ago. In the first place, what limited actuarial literature there was before the 1980s on the subjects of capital and surplus focused almost exclusively on earnings and measures of profitability from the standpoint of the management and allocation of capital rather than from the standpoint of its role as a protector of solvency.

Significantly, until the 1980s, no major life insurance company had failed during the working lifetime of most actuaries then in practice. But as with so many aspects of the life and health insurance business, the last decade was, in many respects, a watershed. Most of us have witnessed a revolution in the kind of products we offer, the way they are marketed, the investments made to match the liabilities they create, and the levels of profitability they generate. As we have seen, the failure of such institutions as Baldwin United, and more recently Executive Life, First Capital and Mutual Benefit, have made us cogently aware of this issue.

In response to public concerns about solvency brought about by these failures, a number of states in the U.S. have established formula-driven requirements for minimum surplus based on characteristics of the company's assets and liabilities. Late last year the NAIC established two working groups, one for life and the other for property and casualty, to develop standards for risk-based capital in their respective areas. The three of us on this panel from the U.S., Mike Zurcher, Dennis Lauzon and I, are all members of an industry advisory committee to the NAIC Life Working Group and some of what we'll be covering relates to that work.

In almost complete contrast to the upheaval that we have seen in markets, products, and investments, the regulatory reporting process that those of us south of the border, at least, have to work with depends on a format that, on first appearance, seems to have changed very little since its last major revision in 1951. Until 1950, the NAIC blank was only slightly modified from the original form adopted by the then NCIC in 1875. Since 1951, and especially in recent years, the NAIC has added many details without changing the overall structure of the blank. Ideally, the current efforts of the NAIC Working Group and the industry advisory committee will lead to substantive revisions to make that blank more valuable as a source of data to evaluate solvency.

The situation here in Canada, by contrast, is quite different. Statutory financial reporting was modernized in 1978 when the valuation actuary concept was introduced. The report of the valuation actuary to the regulators contains considerable information relating to solvency. Canadian regulators proposed in 1983 that risk-based capital and surplus requirements be made part of the reporting process and adopted a risk-based minimum capital requirement in 1989. Owen will be describing that to us later.

Fortunately, the actuarial profession has not let the limitations of the accounting processes restrict our development of ways to appropriately measure financial risk – the risk inherent in present products and investments. Unfortunately, however, we still find ourselves hobbled in adapting these modern risk assessment approaches to the data available.

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As an example, which I cited in an article in the October 1991 issue of *The Actuary*, "Managing Risks: Right Questions – Wrong Answers?," we have made major strides in the past decade in developing stochastic and risk theoretic approaches to evaluating reserves and surplus needs – what most of us like to think of as the leading edge of actuarial science for the early 21st century. Yet when it comes to stating actuarial opinions, we often seem, certainly in the United States, more closely tied to the single moment, deterministic approaches of the 1800s than the 21st century.

The profession has taken a number of steps in North America to lay the theoretical groundwork for those involved in current efforts to help regulators to find standards for risk-based capital.

Probably foremost in terms of helping organize our thinking about the subject is the work of the Society's Committee on Valuation and Related Areas, COVARA. This was established in 1976. This committee studies actuarial principles and practice in valuation of assets and liabilities, determination of adequate surplus levels and related solvency issues. It was COVARA that came up with the analysis of risk into its various contingency components – C-1 through C-4. This approach to insurance risk has become institutionalized in North American actuarial literature and, as you will see, it forms the basis for much of the work that our panelists will be presenting.

Another group that has advanced the thinking of actuarial responsibilities related to valuation in the U.S. is the joint Society of Actuaries' and Academy of Actuaries' Committee on the Valuation Actuary. Again, I won't belabor the issue, but I would refer you to the excellent summary of the work in the May 1991 issue of *The Actuary* by the committee's recent chairman, Walter Rugland, our new President-Elect.

Finally, as I've already alluded to and referenced in my article, we must credit the Society's education community for publishing *Actuarial Mathematics*, a landmark work that sets out for our students much of the theory for the risk-based approach to managing life and health contingencies.

The literature generated over the past decade or so is too extensive to list here, but for those interested in a crash course we have prepared a selective bibliography, which is listed at the end of this session article. Before I steal any more of my colleagues' thunder, I'll quit pontificating and turn the session over to our first panelist, Dennis Lauzon, who will cover current developments in the U.S., including the role of rating agencies.

MR. DENNIS P. LAUZON: Let me preface my remarks by saying the NAIC does not have a risk-based capital formula or even a proposed formula at this time. An experimental formula, which is in a constant state of flux, is being developed by the NAIC industry advisory committee.

Risk-based capital formulas, also known as leverage formulas, have been developed by industry observers such as A. M. Best, Conning, Moody's, S&P, Weiss, and by states such as Minnesota, New York, Utah and Wisconsin. What can we learn from these formulas?

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First, many of these formulas have changed over time to accommodate justifiable criticism and changes in the environment. This is good. The NAIC should also have a process to update its formula for changes in the environment or lessons learned from experience.

In several instances, the industry observers use a multiple-formula approach. Conning calculates the actual-to-required capital ratio with and without dividends. Best has at least four leverage ratios. Weiss develops requirements for two economic scenarios. The current Insurance Regulatory Information System (IRIS) ratio system is a multiple-formula approach. I can see the NAIC's capital adequacy formula some day evolving into a multiple-formula approach. For example, a liquidity formula could be combined with a capital-adequacy formula to develop an overall liquidity and capital measure.

Industry observers also use a wide range of approaches for the handling of subsidiaries. This has been a difficult issue for the advisory committee. Like the Minnesota risk-based capital formula, the current thinking of the advisory committee is to examine a parent's risk-based capital requirements on a consolidated basis with its insurance subsidiaries. For noninsurance subsidiaries, the industry observers have capital requirements that range from 0-100%. The advisory committee is still considering several possible approaches for subsidiaries. In the future, a possible solution is to have the Standard Valuation Office (SVO) place subsidiaries in a risk-based capital category much as they now place bonds in Mandatory Securities Valuation Reserve categories. This would allow several gradations of requirements for subsidiaries based on a sub-by-sub analysis.

The end result of a formula's development is usually a capital adequacy ratio of actual capital to required capital. Some formulas subtract some requirements for some asset categories for statutory capital. This reduces the size of both the capital available and the required capital. In essence, because the requirements for these assets are deducted from capital, they are treated like reserves. Other formulas include all C-1 requirements as part of the required capital. I'm not sure there's a significance here. However, the proper reserving for assets is an issue that can complicate the development of a risk-based capital formula.

Another point of interest is that the majority of these formulas do not adjust capital requirements for volatility differences related to size diversification or for diversification among types of risk. These adjustments are probably sacrificed to keep the formulas simple.

Keeping it simple and keeping it fair are often competing objectives in designing a risk-based capital formula. When a rating agency's risk-based capital formula is not totally representative of a company's true condition, the agency's claims paying rating and commentary on the company put the formula's results in a proper perspective. On the other hand, if the NAIC's formula misstates a company's capital adequacy, the results will not be accompanied by a rating or commentary. The results will be accessible to the public without an explanation. For this reason, I believe the NAIC should be more willing to sacrifice some simplicity, especially in terms of the length of the formula, to have a formula that adjusts for a number of items that may be minor for the industry as a whole, but critical for a significant number of companies.

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Let me touch on C-3 risk before I turn to mortgages and real estate. A typical formula approach to C-3 risk is to segment annual statement liabilities into groups with similar interest rate risk characteristics. The advisory committee is considering this approach. Actual interest rate risk depends on many factors, including underwriting, contract provisions, supporting investments and portfolio management. These factors are not reflected in the annual statement. Thus, using only an annual statement segmentation has the potential to seriously distort actual C-3 risk. In recognition of this, the advisory committee is considering ways to make use of the valuation actuary opinion.

Some advantages of incorporating a valuation actuary's opinion in the C-3 requirements are recognition of margins in reserves, recognition of profit margins, and encouraging and recognizing asset/liability matching. This approach also has difficulties; it would add pressure to the valuation actuary's opinion in terms of measuring capital adequacy – an area that is not related to the basic purpose of the opinion, which is reserve adequacy.

My next topic is real estate. I was disappointed that this year's valuation actuary symposium did not have a section dedicated to investments supported by real estate. Investments backed by real estate account for over 20% of the industry's assets, and we have a very depressed real estate market. The valuation actuary working for a company with 20% of its investments supported by real estate assets needs a reasonable grasp of real estate markets, mortgage, and real estate investments, and the company's liquidity. A complete reliance on investment professionals who are not subject to the standards and the discipline of the Academy would seriously devalue the valuation actuary's opinion.

Richard Ennis and Paul Burik, in an article in the May/June 1991 *Financial Analyst Journal* titled "Pension Fund Real Estate Investment Under a Simple Equilibrium Pricing Model," examine the problems of pinning down the volatility of real estate returns. This article notes a Salomon Brothers survey where 102 respondents involved in a range of pursuits related to real estate believed, on average, that real estate volatility was 60% of stock volatility. Assuming the returns on stock and real estate have similar distributions and stocks have capital requirements of 25-30%, an application of the 60% volatility ratio would result in comparable requirements for real estate of 15-18%.

While absolute requirements are important, this type of relative examination is also important. If we want an efficient industry, required capital incentives for acquiring one investment type over another should agree as much as possible with market incentives. I would not expect the final real estate requirements in the NAIC formula to be 60% of the stock requirements. These two investment types have differences other than volatility, such as their accounting treatment, and how they are taxed.

Long term, the following questions should be studied with an eventual aim of improving the real estate portion of any existing risk-based capital formula. First, should an appraisal process be developed and requirements suggested for unrealized gains or losses? Should this be done on an aggregate or a property-by-property basis? Second, how should requirements be adjusted for liquidity? Third, how should requirements be adjusted for taxes? And fourth, should requirements be refined by

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type of property, by the stability of a property's income or based on the diversification of a portfolio? A perfect risk-based formula will never be achieved. This short list is just an indication of the kinds of issues that can legitimately be raised for ongoing improvements.

Many issues are also being raised on the reporting of mortgages. Many changes are being considered for the annual statement. The categories available for distinct requirements on mortgages will probably include the following types: (1) guaranteed by the Federal Housing Administration (FHA), Veterans Administration (VA) or the National Housing Act of Canada, (2) one-to-four family residentials, (3) agricultural or farm mortgages, and (4) others that would include commercial mortgages and residential mortgages for more than four families.

Reporting probably will also include the following statuses: (1) performing mortgages that have not been restructured, (2) performing mortgages that have been restructured, (3) delinquent, and (4) in the process of foreclosure.

Let me discuss the relationship of requirements based on status and then turn to requirements by property type.

Current thinking is that the capital requirements for delinquent loans would be twice the requirement of performing loans. I have noted this by an X and a 2X on Table 1. There is some discussion on whether 60 days or 90 days overdue should define delinquency. In either case, I expect the requirement for delinquent mortgages to be about twice that of performing mortgages, although that's only my assumption.

TABLE 1
Illustrative Mortgage Status Relationships

Performing	X
Restructured	2X to X
Delinquent	2X
In Process of Foreclosure	Provision for Write Down of Real Estate

In my opinion, without compelling evidence to the contrary, requirements for restructured loans should, at least initially, equal the requirement for delinquent loans. The initial requirement could grade to the requirement for performing and not restructured loans over a period of time. Finally, the requirement for mortgages in the process of foreclosure should be adequate to provide for a write-down on the mortgage and for the capital requirement needed when the mortgage becomes real estate acquired in satisfaction of debt.

Turning to commercial mortgage requirements, the general consensus is that the requirement should fall between the requirement for category two and three bonds. Category two bonds are often investment grade, triple B, while category three bonds are more like a double B bond. A crude verification of this assumption that commercial mortgage requirements should come between the requirements for category two and three bonds can be made by examining the relationship of risk premiums required in the marketplace on these investments.

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Mortgage spreads on Table 2 are from Mass Mutual's internal database. The bond spreads were based on yearly spreads calculated by Mike Zurcher from data provided by Ed Altman. These spreads were only a crude indication of relative risk. Prime 10-year rates are just that. I would guess that, on average, the actual 10-year deal was done at about 25 basis points above the prime. In addition, to get pure risk premiums the spreads would need to be adjusted for expenses, call, and liquidity premiums. I don't believe these uncertainties change the basic result; mortgage risk premiums, at least over this historic period, have been between the risk premiums for category two and three bonds.

TABLE 2
Spreads
1985-89

Prime 10-year Mortgage	BBB Bond	BB Bond
175 B.P.	163 B.P.	284 B.P.

To get some idea of what the requirements for commercial mortgages could be, let's look at a deterministic scenario in Table 3.

I start with the yearly foreclosures equal to the current delinquency percentage for commercial mortgages given in the June 1991 ACLI Report. The percentage is the delinquent loans and loans in the process of foreclosure divided by the total of all loans. This percent is based on dollars and not on loan count.

TABLE 3
Illustrative Commercial Mortgage Scenario

Foreclosures	5.41%
Loss on Foreclosure	<u>25%</u>
Pre-Tax Loss	1.35%
Tax Savings	<u>× .66%</u>
One-Year Surplus Loss =	.89%
Event Horizon (Years)	<u>× 3 to 4</u>
Required Capital	2.7% to 3.6%

Next, I assume there's a 25% loss on each foreclosure. This approximates the Schedule B data for the nine companies in Mass Mutual's competitor database with decreases in book value by adjustment of 10% or more in 1990. Their aggregate write-down was 21.4% with a company average write-down of 21.2%.

Next, I assume a tax offset is available for the write-downs. Tax offsets become available at the time of foreclosure and they are applied to ordinary gains. Thus, they do not compete with other capital losses for offsets. The one-year result is a surplus loss of 0.89% of the outstanding loans.

I have called the number of years over which this scenario is played out the event horizon. I developed a range by using two event horizons of three and four years. This leads to required capital of 2.7-3.6%. The event horizon is clearly a wild card.

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The marketplace for mortgages is changing dramatically. Anthony Downs, in a February 1991 Salomon Brothers Report on "The Fundamental Shift in Real Estate Finance From a Capital Surplus in the 1980s to a Capital Shortage in the 1990s," gives an excellent account of the causes of the current conditions of the real estate market and the impact that certain changes will have to shape the future.

While further study is needed, the ACLI data also indicate that requirements for one-to-four family mortgages should be less than the requirements for commercial mortgages and that the requirements for farm or agricultural mortgages will be more than the requirement for commercial mortgages.

As with real estate, there are questions that could be studied with the eventual aim of improving the mortgage portion of any existing risk-based capital formula. Let me suggest three broad areas of future study. First, should commercial factors be refined by type of property, such as office, retail, hotel or industrial? Second, should requirements be refined for mortgage characteristics, such as the loan-to-value or debt-coverage ratios? Third, should requirements depend on special features, such as equity participation, guarantees, or other collateral? If the answers to some of these questions are yes, then changes will be required in the annual statement to report on these characteristics.

My final comment on mortgages relates to an industry adjustment factor. This factor would compare some measure of a company's mortgage experience with an industry average and adjust the company's capital requirement accordingly. This would better recognize experience, and hence, encourage better underwriting, loan origination, and management practices.

However, I do have a concern about the overall dynamics of a risk-based capital formula. Not only are capital requirements not usable, a complaint often made about conservative reserves, but they will actually increase when capital is strained. This will happen because in unfavorable circumstances, for example, mortgages will move from the lower capital requirement status of performing to the higher capital requirement status of acquired in satisfaction of debt.

The industry adjustment factor will emphasize these dynamics for companies with poorer than average experience. These dynamics build in temptations to delay the recognition of problems, and to the extent we can avoid building in these temptations, we should.

Let me conclude by saying while the financial industry is facing difficult times, this is a time of opportunity for the actuarial profession. Actuaries have the skills, and the credibility and are strategically positioned to mold a safer financial industry that is an efficient user of capital. I hope we live up to these responsibilities.

MR. COWELL: You've heard from Dennis and me as to how things are proceeding in the United States. We're now going to turn to Canada and hear from Owen Reed as to what has actually happened with regard to the development of the risk-based capital process in Canada, and the involvement of Canadian regulatory authorities. Owen is going to give some of his own perspectives as to how his company uses the process.

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MR. OWEN A. REED: I'd like to begin by explaining a bit about Canadian statutory accounting.

The policy reserves are determined in relation to the balance sheet asset values and the actuarial assumptions are reviewed annually. That is, the valuation assumptions are dynamic and the reserves are consistent with the asset values. The running rules for selecting the valuation interest assumption are similar to the New York Regulation 126 rules. Provision for asset defaults is made, and the reserve is expected to make reasonable provision for mismatch of projected asset and liability cash flows. Actuarial assumptions for mortality, morbidity, lapses and expenses are expected to include reasonable provisions for adverse deviation.

The Minimum Continuing Capital and Surplus Requirements are known as MCCSR. They've been developed by the life insurance industry and were developed in relation to the particular financial reporting set-up I just described.

It all started with the Canadian regulators. In 1983, they felt that serious consideration should be given to introducing risk-based MCCSR.

In March 1985, they provided the industry with recommendations that had been developed for them based on a certain amount of risk analysis and asked for the industry's comments and views on the matter.

At the same time, the industry was being pressured on the issue of setting up a guaranty fund in case a life insurance company became insolvent. It was therefore decided to develop an industry-managed guaranty fund with any company covered under this scheme having to meet the minimum capital and surplus requirements. The recommendations to the regulators, which have just been referred to, were the starting point and, of course, some companies had their own formulas or were developing ideas for one. The scheme went into effect on January 29, 1990, but the MCCSR formula is still evolving.

There are C-1, C-2 and C-3 components with a general override that if the valuation actuary thinks that additional provision is appropriate, it's added to the MCCSR. An example would be if part or all of the provision for additional AIDS mortality was made by appropriating surplus instead of adding to the reserve.

A reasonable assessment of the MCCSR formula is that it's plausibly risk-based. I don't believe there's any real theory behind the C-1 component and behind some of the C-3 components. Regarding the C-2 components, the principal author worked for a company that had applied risk theory to some of its important lines of business and my understanding is that this influenced the suggested formula, as did the risk analysis work that was done for the regulatory authorities.

Of course, "generally appropriate" C-2 components have to be fairly broad brush. There must be considerable variation from company to company because of the differences in the margins and the premiums, the retention limits, actual versus industry experience, and so on.

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Bonds are shown in Table 4. The factors for bonds are somewhat similar to the Mandatory Securities Valuation Reserve factors and they're no more magical than the MSVR factors or less magical.

TABLE 4
Bonds

	Factor, %
A. T-Bills and Notes	Nil
Bank CDs	0.25
Comm. Paper -- R1	0.25
-- R2	0.5
-- R3	2.0
B. Federal Bonds	Nil
AAA	0.25
AA	0.5
A	1.0
BBB	2.0
BB	4.0
B	8.0
Lower than B	16.0

For mortgages, the basic formula is 2%; undeveloped land 8%. There should be a 20% factor on mortgages that have been written down.

The factors for stocks, what you'd call experimental, are based on the market value of the stocks (Table 5). The preferreds rank similar to MSVR factors for bonds. Basically, the factor is 15% for widely traded stocks. That might not sound like a very high figure, but there isn't any transitional rule for buildup of MCCSR. So if the market drops by 15%, you've wiped out your provision, but you still have to set up 15% of what's left. Broadly speaking, if you think you're going to invest in stocks, you need to have a 30% surplus.

TABLE 5
Stocks

	Factor, % of MV
Preferred -- 1	1.0
-- 2	2.0
-- 3	4.0
-- 4	6.0
-- 5	15.0
Common*	15.0

* Other than subsidiaries owned > 30%

These factors in Table 6 are applied to real estate. Companies do have to report real estate on a market-value basis. The factors vary depending on whether they're company occupied, which means that they've really got a high-class tenant, and so

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on. For my own company, as a matter of interest, the factor averages to 8.25% of market value and 11.5% of book value.

TABLE 6
Real Estate

	Factor, % of MV
Used by Company or Consolidated Subsidiary	4.0
Income Producing and Not Basket Investment	7.0
Other	15.0

The discussions on how to handle subsidiaries lasted many hours on many different occasions. This is because there's such a variety of situations. Basically, the only consensus that emerged was that the C-1 risk for a subsidiary, relative to a diversified portfolio of common stocks, could range all the way from quite low to quite high, and that goodwill could range all the way from questionably high to easily defensible, to negative.

Goodwill was a really hot topic. A major difficulty in dealing with the regulatory authorities on goodwill is that since you can't write the parent company up to market value, they have a little bit of difficulty with the idea that someone wants to write the subsidiary up to market value, especially a wholly owned one.

On the other hand, there's no denying that the market values of listed stocks typically include a very significant element of goodwill, so why shouldn't the subsidiary's value? If the subsidiary is consolidated with the parent, the MCCSR factor for any goodwill in the subsidiary is 25%. For unconsolidated subsidiaries, the C-1 component is 25% so that it's on level footing.

Now we move to the C-2 component and I'd like to begin with accident and health business.

Table 7 shows you the set-up for admitted disability claims. As you can see, the factors depend on the duration since disability and the duration for the remaining benefit period. My own company found the test of using its methods resulted in an average factor that was about right on the mark with our own development.

TABLE 7
Disability Insurance -- Continuing Claims Risk

Benefit Period Left	Time Since Disabled		
	≤ 2 Years (%)	2 ≤ 5 Years (%)	> 5 Years (%)
< 1 Year	4	3	2
1 ≤ 2 Years	6	4.5	3
> 2 Years (Life)	8	6	4

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There's an active life risk, of course. The premiums might not have been adequate, so there's a factor that depends on the guarantee period associated with the premiums (see Table 8).

TABLE 8
Disability Insurance -- New Claims Risk

Premium Guarantee Remaining	% of Annualized Underwritten*	Premium Other
≤ 1 Year	12	12
1 ≤ 5 Years	20	25
> 5 Years	30	40

* Each Policy/Certificate Individually Underwritten

There's a similar approach for other health business (see Table 9). When you calculate the component for all the accident and health business, there's a grading factor for the size of the company. The reason for this is that there's a feeling, of course, that the larger the company, the better spread of risk that it should have with a smaller percentage range of variations in experience.

TABLE 9

A. Other Health New Claims Risk Cont. Claims Risk	12% Annual Prem. 10% of O&U Res.
B. Adjustment for Size <u>Component</u>	<u>Factor</u>
≤ 10 Million	1.00
20	0.95
50	0.85
≥ 100 Million	0.75

Moving to the C-2 component for mortality, the factors here are probably similar to what you see in the New York or other formulas. At this stage, you can see in Table 10 that for group life insurance it would be a 50 cents per thousand factor.

TABLE 10
Mortality Component of MCCSR
\$ per 1,000

Participating, Adjustable & Universal Life	1.00
Other:	
Remaining Guaranteed Term	
≤ 1 Year	0.50
≤ 1-5 Years	1.00
> 5 Years	2.00

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There's a grading by size of company again, for the same reason as for accident and health.

The factor for group life is 50 cents per thousand, so for a large group life carrier, you'd apply a 60% weighting and you'd end up with 30 cents per thousand, which is a little bit lower than the formula I've seen floating around for the U.S. situation. That comes down to 30 cents for the basic group life and it comes to 15 cents for AD&D times 0.6, which would be nine cents per thousand for AD&D. (See Table 11.)

TABLE 11
Adjustment for Size

Calculated Mortality Component (Millions)	Factor
≤ 1	1.25
5	1.10
10	1.00
20	0.95
50	0.85
100	0.75
150	0.70
200	0.65
≥ 1,000	0.60

Regarding the C-3 component, as you can imagine, the factors vary depending on whether there is a market value adjustment possible on surrender. The factors, of course, increase as the interest guarantee period increases on single premium deferred annuity type business (Table 12). There's a 1% factor for participating individual business. I guess universal life has caught up as well. Now, you can see that the factor for single premium pay-out is 1% and that isn't very large, but you'll remember that the reserves themselves were supposed to be matched.

TABLE 12
Changes in Interest Rate Environment Risk

Product	Interest Guarantee Period	Factor %
Life & Health	< 5 Years	1*
	5-10 Years	2
	10+ Years	3
Endowment	< 5 Years	1.5*
	5-10 Years	3
	10+ Years	5
Single Premium Payout Annuities		1
Accumulation Funds	< 6 Months	0.5
	< 10 Years	1 or 5
	10+ Years	2 or 10

* These factors apply to PAR Business

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In determining available capital, surplus appropriations are freed up. However, where a surplus appropriation is really in the nature of a reserve, there's a 100% MCCR requirement (see Table 13). In other cases, the factor is zero, 8% or 15%. We have, in the Canadian annual statement, a lot of items that are nonadmitted assets like small computer equipment, furniture and so on, and there's an 8% factor for them. For statutory currency reserves, you free up the appropriated surplus, but then you've got to set up a 100% requirement to cover it. The regulators have some differences of opinion with the industry on some of these items. The first item is cash-value deficiencies and negative reserves. The industry formula currently calls for an 8% capital requirement. The regulators want the negative reserves covered 100% and the cash value deficiency is 50%.

TABLE 13
Miscellaneous Capital Requirements

	Factors
A. Reserve for Cash Deficiencies and Amounts of Negative Reserve	8
B. Valuation Reserve for Miscellaneous Assets And Other Investments	8
C. Statutory Currency Reserves	100
D. Reserve for Reinsurance Ceded to Unregistered Reinsurers	100
E. Surplus Appropriated for Special Risks Not Covered by the Formula	100

Now a brief look at available capital (see Tables 14 and 15). Like the banks, the available capital is divided into tier one and tier two. Tier two capital can't be more than 50% of tier one. In Canada, if you look at line eight in Table 15, stocks and real estate are carried at values that are amortized towards market, and when you realize gains, you have to reverse them and amortize them. So the first line says that unamortized realized gains can be freed up and counted as available capital. The cash is already in the bank. We get a credit for the excess of market over the book value, however, in tier two capital. That's the x on the bottom. You have to take the difference between market and book, and then knock off selling costs and the liability for the capital gains tax. If you have anything left, you can add it. If it comes out negative, well, that's bad luck too.

TABLE 14
Banks' Available Capital

	Tier 1	Tier 2
1. Capital Stock	X	
2. Retained Earnings	X	
3. Perpetual Preferreds	X	
4. Realized Gains (Reserved)	X	
5. Subordinated Term Debt (Term Preferreds, Debentures)		X

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TABLE 15
Available Capital & Surplus -- CLHIA Formula

	Tier 1	Tier 2
1. Common Stock	X	
2. All Perp. Preferreds	X	
3. Other Preferreds		X
4. Sub. Term Debt		X
5. Unappropriated Surplus	X	
6. All Appropriated Surplus	X	
7. Deferred Inc. Taxes	X	
8. Stocks & Real Estate		
1. Unamort. Real. G/L	X	
2. Unamort. Unreal. G/L		X
Less Selling Costs		
Less Taxes		

The regulators also want to shave the investments on unrelated financial subsidiaries, whereas the industry wants them consolidated in and their minimum capital requirements separately calculated. You may be interested in what I think of the formula for MCCSR as it applies to my own company. Regarding the mortality and morbidity components, we would certainly squawk if it weren't for the grading factors. We did an extensive risk theory analysis of our group life and group LTD business many years ago and, using the results, developed an integrated system for maximum amounts of cover, credibility factors, large amount pooling levels and stop-loss levels. With the premiums set at the appropriate level, this kind of system considerably lessens the risks that arise from fluctuations in claims experience.

In those days there were also influenza epidemics that caused group life death and disability claims rates to rise quite appreciably every couple of years, or so it seemed. These seemed to be quite manageable through the experience rating process and applying premium increases and, of course, claims stabilization funds helped. I think that for both group life and health, however, you need a factor related to new premiums, because that's where most of the underwriting risk is embodied. I think the factor for new premiums should be quite a bit higher than it is for renewal premiums. In my own company's case, we can't really see the whole portfolio of premiums being that much out of kilter, but the new premiums are a horse of a different color.

Table 16 shows the factors that my own company uses for internal purposes -- 22% of new annualized premiums, 2% of renewal premiums. Then these factors apply to the pooling charges -- 75% of large amount pooling, 225% of stop-loss, 7.5% of fully pooled business. We have a big slice of the latter category in Britain. We're a very large underwriter in group life in Great Britain where the business is strictly *nonpar*, all fully pooled. Strong nerves and a wide spread of the risk are needed.

Excluding claims reserves, for group life, our own company's assessment of what we need comes out to be 95% of the industry formula.

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TABLE 16
Some Sun Life Factors Group Life

A. Risk of Premium Deficiency	
New Annualized Premiums	22
Renewal Annualized Premiums	2
B. Risk Fluctuation	
Large Amount Pooling Charges	75
Stop-Loss Charges	225
Fully Pooled Business	7.5

When the formula for A&H business was being developed, the message that we seemed to be continually conveying to the industry group was that the result for A&H business is still too high. We don't need that much capital to manage our health business. The latest formula seems, to us, not unreasonable relative to our own business.

Moving to another topic, early on I pondered on the extent to which MCCR should be affected by income tax, but I kept my thoughts to myself. If you take the C-2 component, for example, heavy morbidity and mortality experience will result in a lower taxable gain from operations. So if the company is in the right tax situation, the excess experience is tax deductible. But is the company in the right tax situation? Also, my own company has significant operations in territories where tax isn't on a gain from operations basis.

The C-1 components for stocks and real estate have covered a drop in the market values, so this is all unrealized losses and there isn't any tax effect. Also, you may recall that I mentioned in Canada you get a credit for the excess of market over book value of stocks and real estate. You have to take into account the provision for capital gains tax. Well, right now that's being done as if you sell the whole portfolio in one shot and that's certainly debatable, especially for a company that has a significant amount of stocks and real estate like my own company.

In closing, it should be pointed out that the capital adequacy test I've described is off-balance sheet. For a company like Sun Life which has significant stock and real estate investments, available capital exceeds statutory balance sheet capital. On the other hand, the MCCR is relatively high because of the stocks and real estate. In fact, it was about 8.2% of our general account liabilities at 1990 year-end.

MR. COWELL: Owen has given us a good idea of what those of us in the U.S. have to face when we finally get our risk-based capital formula together. Our final panelist is Mike Zurcher. As I previously indicated, he has been very active in the whole area of risk-based capital. He has written extensively on the subject. He is probably one of the most solid contributors that we have on our advisory committee to the NAIC, and Mike is going to describe some of the real theory behind the C-1 risk as it relates to bonds and the C-2 risk as it relates to mortality. Mike will also have some other comments on application of risk-based capital in general.

MR. MICHAEL L. ZURCHER: I have now participated in setting risk-based capital formulas for both my company, Lincoln National, and for the life industry as part of

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the advisory group to the NAIC. From these experiences, I have come to a less than startling conclusion – constructing a target surplus formula is not a very easy task. However, performing analysis to develop factors for the many types of insurance risks is made easier if you can identify what it is you're trying to measure and then apply the concept consistently across all risks. I will discuss a generalized approach I have used to quantify risk needs, provide a specific application of this approach and identify some considerations and concerns of risk-based capital formulas in general.

One concept of solvency risk quantification is to maintain enough surplus to withstand a catastrophic event assumed to occur once every hundred years or so. Surplus levels are set deterministically by looking at historical experience or by providing for a specific scenario that is perceived to be near the tail of the risk spectrum. Another approach is to measure risk exposure in terms of the losses that can occur over a period of years, including the one-year catastrophe. Under the second approach, which I will be discussing, cash-flow modeling is frequently used.

The models we have developed employ Monte Carlo techniques wherein the liability and/or asset flows are affected each period by random risk events and by outside influences such as economic trends and interest rate changes. The required surplus for a given scenario or trial is defined in terms of the present value of the model gain and loss deviations relative to the expected cash flows. Ideally, these deviations take into account product terms, pricing margins, and reserve levels.

Surplus needs for a given trial are calculated as the amount of initial surplus funds needed so that the accumulation, with interest, of this initial amount and subsequent cash flows will not become negative at any point throughout the modeling period. Obviously, this is a more stringent test than requiring nonnegative surplus at the end of the modeling period only. You then take this required initial surplus amount and divide it by beginning assets or liabilities to get a surplus factor.

A risk exposure distribution can be created by running an appropriate number of trials. Target surplus factors can then be chosen from the distribution, at whatever percentile provides the desired protection level. An example of this generalized approach can be found in a model we have used for setting C-1 bond factors. Key assumptions for the bond model for each rating class include the expected default rate, the percentage of principal loss upon default, and the effect of economic conditions on the default rate and principal loss.

In simple terms, the model works like this. Each scenario for a portfolio begins by randomly generating a series of annual economic conditions over the length of the modeling period. Using Monte Carlo techniques, a given bond is tested for default each year where the default probability varies with that year's economic environment. If a default takes place, the principal loss amount is determined and the bond salvage value is reinvested in a like quality asset. The process is repeated for every bond in the portfolio. The portfolio's annual net cash flows are then used to determine the surplus needs for that trial.

Another important assumption of the model is whether or not dollars are being regularly set aside to fund default losses that occur on an irregular basis. The funding could be considered a credit "risk premium" and set equal to the expected annual

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default loss. The derived surplus factors, therefore, would reflect the loss deviations over and above the expected losses.

The model I have just described is relatively straightforward. There are additional levels of complexity, or maybe I should say reality, that should be considered before feeling satisfied that the model is providing a sound measure of risk.

The level of the measured risk will vary as the make-up of the bond portfolio itself changes. The risk parameters that need to be considered in terms of the portfolio include:

1. The number of bonds or issuers. As the number increases, the measured risk will decrease.
2. The distribution of bond amounts. A greater variance in size distribution (that is, where all the bonds are not the same size) will increase the risk. The concentration effect from having a few, very large issues can also be measured.
3. The rating class. The portfolio rating class can be varied to measure the risk of one class of bonds or any mix of classes.
4. The modeling period. The portfolio risk is measured over a given period of time. One approach sets this period to be consistent with the liability obligations the portfolio is supporting. Alternatively, an actual portfolio could be used where each bond is modeled to its true maturity.
5. "Risk premium" funding. The level of risk will decrease as the annual increment to the reserve type fund is increased. The funding can be a level percentage based on expected losses or similar to the Mandatory Securities Valuation Reserve or AVR funding or the annual increments can depend on the fund's relationship to a maximum level.
6. Portfolio make-up -- The portfolio make-up where all the above parameters are considered can also be put together and compared to the risk of a standard portfolio.

Several items should also be reviewed when considering the bond model's level of sophistication. These items need to be evaluated in terms of their potential effect on the results and the model's ability to realistically reflect their influence on risk. Here are a few examples that were considered for the bond model.

1. Tax treatment is a very important assumption, as Dennis and Owen both have already alluded to, and I'll talk about this a little more later in my presentation.
2. "Select and ultimate" default rates. Using select and ultimate default rates is one way of incorporating future rating quality changes into the model. The current rating of the bond at the start of the model provides the best indication of its future importance.

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3. Economic influences. The econometric dynamics and their influence in bond performance could be modeled with many levels of sophistication.
4. Sale and reinvestment of a defaulted asset's proceeds. The timing of the bond sale and realization of loss could be assumed to occur immediately or perhaps one or two years down the road. The treatment of the reinvested salvage value of the bond must also be considered.
5. Loss recoverability from contractholders. Depending on the nature of the liabilities the assets are supporting, an assumption could be made that some losses are passed on to contractholders through dividend formula changes, crediting rate changes, or cost of insurance adjustments.
6. Excess spreads. Spreads over the valuation rate may be available for absorbing future losses. However, consideration must be given to the related risk-premium funding assumptions you've made when evaluating the appropriate use of these spreads.
7. Public versus private bonds. Differences in default and loss experience between public and private bonds, if known, could be recognized in the model as well.
8. Other concentrations of risk. Other concentrations of risk, such as by industry or by underwriter, may also have some influence on the overall level of risk.

As important as the analysis is for each specific risk, like the bond default risk we've just discussed, there are other considerations that are just as important when trying to consolidate the individual analyses into a total risk-based capital formula.

1. Combination of risk. Ideally, you would have one model that measures all risk simultaneously so that the combination of risk is an inherent part of the results. Most risk studies, however, focus on C-1, C-2, or C-3 risk separately. When completed, these risks must be combined into an overall formula. Do you simply sum the C category components, or perhaps recognize some covariance between the C categories such as can be found in C-1 and C-3 risk, or even possibly within a C category?
2. Tax Treatment. There is no right answer as to how to treat taxes for risk-based capital formula needs analysis. The treatment will vary from company to company and by specific circumstances within a company. The treatment can vary as well by the purpose of the formula and its desired level of conservatism. The use of tax credits assumes that other assets or product lines are generating gains that at least offset the losses of the modeled risk. Several factors will influence whether or not tax credits are likely to be available when losses develop. These include the correlation and diversity of risk of other asset and product portfolios relative to the modeled risk and whether the loss event will actually be realized for tax purposes. Another consideration is that, at least in the U.S., realized capital losses, such as you find in C-1 risk, cannot be offset with operating gains, but can be offset with realized capital gains. The possibility of future changes to tax rates and/or tax bases further complicates the treatment of taxes in the analysis.

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3. **Liability margins.** A primary question related to potential margins found in reserves or dividends is not one of measurement, but whether these margins would be available statutorily or legally to support all possible contingencies that might threaten solvency.
4. **Protection Level.** At what level of protection do you establish the factors for each individual risk and then for all the risks combined? At 90%, 95%, or maybe 98%? For some risks, the ability to establish a protection level is very limited, making consistency between risks a problem. The protection level target certainly is related to the decisions you have already made with respect to the combination of risk, tax treatment, liability margins, and C-4 treatment.
5. **Treatment of subsidiaries.** We probably could have had an hour-and-a-half panel on this topic alone. As Dennis and Owen have both mentioned, the major issues involve the different types of subsidiaries, the levels of ownership, and the method of valuing the subsidiary on the parent's books. This is certainly one component of a formula where individual company considerations must be reviewed.

It is apparent that, to best quantify the risk of a given company, you need access to detailed company information. Often this detail is not available in public financial reports, which clouds any conclusions resulting from a generic formula that cannot fully capture individual company characteristics. However, when developing a risk-based capital formula for internal use by your company's management, this nonpublic information should contribute to the formula construction. The following examples illustrate this type of information.

Within C-1 risk, you have things like the company's investment strategies and philosophies, the asset underwriting standards, the asset portfolio size, diversity and concentrations of risk, the credit quality of the mortgage loan and real estate portfolio.

Under C-2 risk, you have things like pricing margins, underwriting practices, contract terms, product portfolio size and mix, the valuation practices of the company, and whether or not an appropriate exposure base is there to which to apply a factor.

With C-3 risk, you have things like the asset and liability relationships and how these relationships are managed, the embedded options of assets and liabilities, withdrawal characteristics of the liabilities, crediting rate strategies, and investment and re-investment strategies being employed.

Within C-4 risk you have the overall quality of the company's management, off-balance sheet items, tax management, and exposure to litigation risk and liquidity risk. You can see there is a lot of very useful information that is not usually captured in the results of a generic risk-based capital formula. Unfortunately, the resulting formula's shortcomings are rarely understood by formula users. Also, the organizations promoting the formula will often make little attempt to inform users of these shortcomings.

In closing, one related area where we, as actuaries, are really deficient in our understanding is in the meaning of the actual-to-target surplus ratios or, as Dennis

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discussed, the capital adequacy ratio. I think these ratios are critical in the use of target formulas. Clearly, a company with an 80% ratio is more at risk than if it had a 100% ratio. However, it is less clear what information the 80% ratio really conveys in terms of the company's risk of insolvency. The same can be said of the 125% or 150% ratio. Take a company with a 100% ratio, for example. Is this company's risk of insolvency two, three or maybe four times greater than if it had a 125% ratio? I don't think we can answer a question like this with very much confidence. Our companies, our policyholders, and our relationships with regulators and rating agencies would all benefit from an increased understanding of what these ratios mean.

MR. ALLAN BRENDER: A couple of things about the Canadian situation. One is, as Owen mentioned, that our MCCR formula is right now a creature of the industry. The legislation currently in force, as well as the new legislation proposed, provides that the regulators can enforce such a formula. The discussions that Owen referred to between the Office of the Superintendent of Financial Institutions (OSFI), which is the federal regulator, and the industry have to do with whether OSFI will implement the industry's formula. They generally will, it seems, but with a few differences that Owen alluded to. I think we would probably expect regulations within the next six months that would require this.

Second, Owen mentioned that our test is an off-balance sheet test, but this is a little bit more than perhaps was conveyed by those words. One cannot do the calculation just by having the public statement, the statutory statement. It involves calculations using numbers that are available only internally in the company. I don't think we have any reluctance to do that sort of thing, but we're not talking about a formula that is really public. I think, even now, that these numbers are given to the industry, the expectation is that they're confidential. I think, from the regulators' point of view, even when they have their formula, the results will continue to be confidential. From what the panelists were saying, I suspect that's not going to be the case in the United States.

One last thing pertains to the activities of the Canadian Institute of Actuaries in this regard. In 1985, the CIA established a committee on solvency standards for financial institutions, including life insurance companies. That committee was first asked whether this formula is enough of a test and whether the profession can be content with just this formula. The committee concluded that the formula and satisfaction of it were a requirement for a company to basically maintain its license, but that the formula was really not flexible enough. We did not think that you could design a formula that was sufficiently flexible to really reflect the circumstances in every company.

We came up with a process that is called dynamic solvency testing, which is going to be enforced beginning in 1992. Every appointed actuary of every company doing business in Canada will have to do projections under a wide variety of scenarios for generally five years or more and test whether, under each of these scenarios, the company at every point in that projection period will be able to meet the formula; in other words, be able to maintain its license. In this way, you're supposed to test all the different facets of sources of risk in the company, test different elements involving management decisions, strategy, external changes, economic environment and so on, and, in some sense, overcome the fact that the formula is a fairly rigid thing. We

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didn't see how we could introduce a company-sensitive solvency test without going this route.

MR. COWELL: Allan Brender is featured prominently in the bibliography. He's written extensively on this subject. Owen, would you like to comment at all on Allan's point specifically relating to regulation and the unavailability of numbers and the confidentiality aspect? Those are issues that you've grappled with in Canada and we're going to have to face those issues in the U.S. as our risk-based capital formula comes into play.

MR. REED: Well, I think Allan is right on the button actually. The regulators asked my company if it would serve as a guinea pig in an attempt to audit such a series of calculations. It took our people six man days to do the calculations, and I believe it took them four man days to do the auditing, so that's an interesting piece of information.

As far as the confidentiality is concerned, I guess everyone is probably a pragmatist to a certain degree. The banks in Canada don't have to publish their capital adequacy results, but all of them do as far as I know, and that's because they can all satisfactorily meet the requirements. No doubt, the strongest companies in Canada will very likely do it voluntarily too.

MR. COWELL: On the confidentiality issue, let me just say, for those of you who watched the Clarence Thomas confirmation hearings, I don't think there is such a thing as confidentiality in the United States anymore, least of all with risk-based capital formulas. We all know the direction the Insurance Regulatory Information System ratios went; they were supposed to be confidential and they weren't. I think most of us on the risk-based capital advisory committee are assuming that there will be no confidentiality. Certainly the press in the United States doesn't seem to think anything ought to be confidential.

The other final point that Allan made was the difficulty of coming up with a single formula to cover all companies, and that's something that we have recognized throughout our process. There is absolutely no single formula that we can come up with that is going to fit every situation.

MR. REED: Mike, I didn't respond to your question of confidentiality and of the industry process. The results very definitely remain confidential.

MR. MICHAEL E. MATEJA: I would like to point out a risk that was left out of the presentation that we should be considering. Our company has been working with risk-based capital formulas for almost 20 years now, and the formula has gotten progressively more complicated. But one thing has been clearly evident as I've watched that formula evolve. No matter how clever we get, we don't have perfect knowledge. No one was clever enough to understand the real risks related to mortgage loans five or 10 years ago. No one clearly understood how far the stock market could fall until October 1987 when it doubled the previous record of a one-day decline.

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Going back even earlier than that, in 1973 I was involved with the pricing of GIC products, and I was assured by investment people far and wide that interest rates were not likely to go much beyond their current levels which were then at 9%. I was assured it was a one in 10,000 probability that interest rates would reach 15%. So, the greatest risk that we have is really that which we do not know or understand. I fear that the next major risk that we'll be talking about at a meeting such as this some years from now will be something that we now accept as commonplace, but in fact, we do not really understand.

MR. COWELL: I think that's very well stated, Mike, and I well recall the event you're talking about four years ago in Montreal. I can remember distinctly that we had a presentation in the morning on what was then considered to be a very significant C-2 risk, the age risk, and it wasn't until we got out that we realized that the C-1 risk was happening all around us. Regarding risks we don't understand, I'd invite all of you who haven't yet read it to look at the September/October 1991 issue of *Contingencies*. There's a very interesting article in there by Michael F. Conwill and Stephen H. Conwill entitled "Out of Chaos Theory, Order (In Particular, Some Economic Applications)." They raise the question of whether or not there are some applications to actuarial science. I think I'm with you. I'm becoming increasingly convinced that there's a lot there that we don't understand, and the more we study it, the more we realize that we don't.

MR. ROBERT J. CALLAHAN: As far as the confidentiality goes, I don't know of any way to keep the formula itself confidential. This was the situation with the Insurance Regulatory Information System ratios. The formula became public and it was based upon public information. Even when the NAIC did not release the results of the IRIS tests, people who had the formula and access to public documents could make their own runs. From what I gather here, you're basically looking at public information as the source of input for your formula. If you need any information that is not currently public, I understand you're looking at changing the blank so as to make the information public.

In any event, if you have a generally known formula based upon public data, there's absolutely no way to keep the results confidential. Now ideally, if the information that you're looking for in public data is on diskettes and put into a database, then it could be easily retrieved by EDP procedures. However, let me quote from your introduction. "The National Association of Insurance Commissioners, NAIC, is actively pursuing the development of a risk-based capital requirement as a recommended replacement for small, fixed-dollar requirements prevailing in many states." I don't think I heard any of the panelists really elaborate on that.

Currently, the small, fixed-dollar capital and surplus requirements, maintenance requirements, vary according to the date the company was organized; therefore, each time the dollar amount was increased, it was always for new companies to be organized. Now, I don't think that you're really looking at that. I think what I understand is that you're looking at applying any new requirements to all existing companies. While I'm a member of the NAIC Working Group, most of the work is being done by the Advisory Group. We are meeting later this month in Washington, but so far I still have not seen any proposals on how they would apply this to existing companies within the current structure of state regulation. Would they propose a

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model law to be adopted by each and every state? What if the states did not care to go along with it? You take one state that has over 700 domestic insurers. Most of them are little, itty bitty companies doing primarily a reinsurance business. You have the next state having between 200 and 300 domestic insurers and a lot of these would not meet the solvency requirements of many other states. Then maybe the next state would have over 100 domestic insurers, and I think New York is right up there with somewhat less than 100 domestic life insurance companies. But when you have 2,300 domestic life insurance companies in the United States, how, as a practical matter, can you make this effective as a replacement for the current, small, fixed-dollar capital and surplus requirements on a maintenance basis, or continuing basis?

MR. COWELL: That's a very good question, Bob. It has been my understanding all along, as a member of the Advisory Committee, that the formula that we develop and present to your task force is going to be adopted by the NAIC, and then, I would assume, incorporated state by state, as with any of the other NAIC developed approaches. I would expect that most states would adopt and incorporate this. I think most of us on the Advisory Committee have assumed that this will then become part of the reporting process. I perhaps dwelled more than I should have on the issue of what this formula is going to replace, but I think the point we have tried to make clearly is that the formula that is ultimately adopted by the NAIC will establish a new standard (recognizing the differences between the two countries), that will take a position in many respects comparable to the one the MCCR occupies in Canada.

As to your other point about confidentiality and availability, again, those of us on the Advisory Committee are highly sensitive to the damage that can be done by misinterpretations and misapplications of formulas. I can remember very distinctly Terry Lennon telling us that his purpose as a regulator, in looking at a formula, is to look for the marginal companies, the ones that clearly are sufficiently capitalized and those that are not. When you see some of the press recently, you can tell that some of our other publics aren't so much interested in which companies are at the margin. They want to know which are the best so they can put their business or their money in the best and which are the worst so they can make a run on the bank on them and drive them out of business.

I think one of the things we have to recognize here is we do have a lot of publics that are going to be looking at these formulas.

MR. REED P. MILLER: I have two points, actually, that I want to make. One is that some of the current thinking of the task force is that the adoption of this formula would be part of what we could call the accreditation process that is actively underway with the NAIC. If a state insurance department wants to be accredited, that particular state would be required to adopt and live by this formula as part of guiding the regulatory action it is taking. To the extent a state didn't take that particular action, the NAIC would then be free to call on an accredited state to head up a task force or team to actually pursue the investigation of a company that triggers this particular formula.

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Another point I'd like to make is that this formula is intended to be a screening device that might have multiple levels of regulatory action depending on the level of surplus that the particular company has relative to the risk-based capital formula. The current thinking would be that, at an initial trigger point, the state would be required, as part of this accreditation process, to actually pursue data from the company in the form of a financial plan or at least plan to analyze, over a period of three to five years, what the likely capital and surplus posture and profitability of the particular company might be.

To the extent a company slides below that and triggers a second level of regulatory action, the state of domicile, to the extent it's an accredited state, would be required to not only pursue data associated with a company, such as a financial plan, but would also be required to begin an investigation of the problems associated with the company. It would need to work with the management of the company in an active sort of way to get the company steered back in a direction so capital and surplus and profitability ratios are headed in a much more favorable direction.

Finally, the third level of regulatory action that's being contemplated would serve as a minimum level that probably would be the greater of the dollar minimums that now exist or this new formula basis. That would then be the point at which a state could actually take over an insurance company. So there would be, in fact, a dynamic risk-based minimum at which the states would be empowered to take action.

MR. COWELL: The other point that I'd like to add is the approach that we are taking on the Advisory Committee, the structure that we're developing, is not vastly dissimilar from what is already in place or being proposed in New York and Minnesota; that is, we follow generally the same structure of assigning each asset a factor based on its credit worthiness, going through the liabilities and assigning factors, and then trying to come up with some form of C-3 measure as well as you can from essentially a static statement. We then see if we need to add anything for the C-4 risk.

In terms of the approach that we're taking, I think of this as sort of a further refinement of what Minnesota and New York have done and part of our testing includes how well we correlate our formula to these states. When you look at the initial testing results, the vast majority of companies do seem to pass and have adequate capital, as well as we can measure it, based on these static measures. I think where we go from here is going to depend considerably on how your task force is going to interpret what we present to you over the next few months.

MR. BURTON D. JAY: I realize that the details of the current version of the formula is confidential, but perhaps the panel will answer a couple of questions. Can a company's RBC be calculated entirely from information contained in the annual statement? It has been indicated that some regulatory action would be required for companies whose ratios fall below 100%. What percent of companies are below this level using the current formula? Will affiliate insurance companies be treated separately or will a consolidated RBC be calculated for the fleet? Finally, what is the implementation schedule expected to be? Will an exposure draft be approved at the December NAIC meeting with a final form adopted in 1992?

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MR. COWELL: I'll try to answer your questions in the order you've asked them. A company's RBC can't be calculated entirely from the annual statement. Additional information is needed on the breakdown of A&H premium. On the basis of [then] current testing, between 10-15% are below this level. Generally, the rules for insurance affiliates follow a consolidation approach. Following testing and exposure, it is expected that the NAIC will adopt some modifications of the proposed formula in 1992 with an effective date of 1993.

MR. STEPHEN A.J. SEDLAK: How is the risk-based capital being coordinated with the valuation actuarial requirements? It seems that if some percentage of the RBC is needed to avoid being placed in conservatorship, this is very similar to a reserve. Can at least this much be treated as a reserve in the determination of reserve adequacy? Not doing so in certain cases might require setting up extra reserves that would have the paradoxical effect of increasing the RBC.

MR. COWELL: Reserves established by the appointed actuary should be based on best estimates, with appropriate margins for adverse deviations. This means that actuarial reserves, together with future premiums and investment income, should be sufficient to mature existing obligations to policyholders. Let's say that the probability that assets backing these "best estimate" reserves, plus future premiums and investment income will be sufficient is 50% plus some margin for safety.

The purpose of RBC is to extend that probability to some higher level -- 85%, 90%, 95% -- at which management can be confident that liabilities will not exceed assets over some defined time horizon.

Ideally, this approach should allow a "seamless" transition from reserves to surplus. However, under existing valuation law, reserves themselves are expected to meet the "best estimate" adequacy test independent of surplus levels.

MR. MATEJA: There is another important issue related to the standards that has not yet been addressed. I believe the Task Force has referred to it as "calibration." Should the standards be set at the equivalent of a AAA standard, the highest investment grade, or a BBB standard, the lowest investment grade? The lower standard was the Task Force target, and I personally feel that this is appropriate given my understanding of the NAIC goals.

It should also be pointed out that the results of the Minnesota formula and the original New York formula are markedly different from the results of the formula recommended by the industry Task Force on an absolute basis. That is, they have been calibrated at different levels. The relative ranking of companies, however, does not change materially under the three formulas. I understand that about 90% of the companies in the test database maintained the same decile ranking under all three formulas. This suggests that added complexity and sophistication may not really help to identify financially troubled companies.

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SELECTED BIBLIOGRAPHY 1981 TO DATE

1. Brender, Allan with Sam Gutterman, Curtis Huntington, and Richard Kischuk. "The Future Measurement of Financial Solvency of Life/Health Insurance Companies in the United States." *Record*, Society of Actuaries, Vol. 14, No. 4A (1988): 1767-1784.
2. Brender, Allan with Richard Robertson, Richard Squires, and Paul Winokur. "Surplus Standards -- United States, Canada, United Kingdom." *Record*, Society of Actuaries, Vol. 11, No. 3 (1985): 1249-1273.
3. Brender, Allan. "Minimum Capital and Surplus Requirements for Life Insurance Companies." Department of Insurance Canada, December, 1984.
4. Brender, Allan. "The Evolution of Solvency Standards for Life Insurance Companies in Canada." Canadian Institute of Actuaries, 1991.
5. Buff, Joseph with Peter Deakins, Michael Mateja, Daniel McCarthy, Robert Stein and Irwin Vanderhoof. "Research of the Committee on Valuation and Related Areas." *Record*, Society of Actuaries, Vol. 13, No. 4B (1987): 2389-2415.
6. Cody, Donald with James Geyer, Sidney Leblanc and Michael Mateja. "Benchmark Surplus Formulas." *Record*, Society of Actuaries, Vol. 11, No. 4A (1985): 1783-1850.
7. Conning, Formulas for Risk Adjusted Surplus (Conning Target Surplus Formula (CTSF)), Conning & Co.
8. Irish, Frank. "Capital and Surplus." LOMA Financial Executive Roundtable, 1989.
9. Kischuk, Richard. "Strategic Management of Life Insurance Companies Surplus." *Transactions*, Society of Actuaries, Volume XXXVIII, 1986: 105-144.
10. Moody's "Benchmark Capital Ratio Revision," Moody's Investors Service Co., 1991.
11. Radcliffe, R. Stephen with Edward Silins and Stanley Tulin. "Actuarial Opinions on Asset-Liability Matching." *Record*, Society of Actuaries, Vol. 11, No 4B (1985): 2317-2339.
12. Sondergeld, Donald R. "Profitability as a Return on Total Capital." *Transactions*, Society of Actuaries, Volume XXXIV, 1982: 415-433.
13. Zurcher, Michael L. "Target-Surplus Formulas Take Center Stage." *Reinsurance Reporter*, Lincoln National Reinsurance, No. 128, 1991: 13-20

