



Office of the Superintendent of  
Financial Institutions Canada

Bureau du surintendant des  
institutions financières Canada

# Advanced Methods in Insurance Capital Requirements

Allan Brender  
Special Advisor, Capital Division

Mexico City, 19 April 2007



OSFI  
BSIF

Canada

# Declare Solvency!

If only it were that simple!



OSFI  
BSIF

# Canadian Financial System

- Actuarial liabilities based upon gross premiums, recognizing all policy cash flows, with best estimate assumptions and explicit risk margins
- Sophisticated risk-based capital requirement (MCCSR) which contains some company-specific elements and makes partial use of stochastic internal models
- Financial condition reporting using stress testing (DCAT or DST)

It should be relatively simple for Canada to adapt to IFRS etc., shouldn't it?



# Canadian Financial Reporting

- By legislation, a single financial report:

regulatory reporting = GAAP

- Accounting standards specify that actuarial standards apply in establishing actuarial liabilities
- Valuation of liabilities is based upon the Canadian Asset Liability Method
  - Makes use of an internal cash flow model



OSFI  
BSIF

# Changes Under IFRS4

- **No specific link to actuarial standards**
  - Reference to Market Value Margins, but no specific guidance
  - IASB is reluctant to make reference to other professions
- **Approach to risk margins**
  - Currently chosen by the Appointed Actuary within a range, subject to professional guidance
  - Following the IAA RMWG paper on risk margins, the method for choosing margins is likely to change (more “objective”)
- **Discounting at risk-free rates**
  - CALM currently contains expected asset defaults and is focused on ALM



# Applicability of Actuarial Standards

- An important issue for Canada since we have a single financial reporting system
- An issue for all jurisdictions with respect to public financial reporting
- For most jurisdictions, this may not be an issue for regulatory reporting since regulators can specify valuation standards or accept local actuarial standards
- IAIS is working to develop standard valuation principles and IAA is developing specific principles-based guidance
- IAIS favours convergence of public and regulatory reporting



# Implications for Capital

- All provisions for credit risk and asset/liability mismatch will have to be treated in capital
- Capital will be adjusted for the “own credit risk” component that will be subtracted from liabilities
- Discounting at risk-free rates creates implicit margins within liabilities; how do we integrate these with required capital?



# Integration of Margins

- The distribution of margins between liabilities and capital has been an on-going problem in Canada
  - Primarily due to the actuary's ability to choose the level of margins while capital requirements have been based upon fixed factors
- The future determination of margins is unsure and not necessarily (as of now) within the power of the Canadian regulator to specify or influence



# Total Asset Requirement

- A new approach to the determination of required capital
- Instead of defining required capital which is an addition to actuarial liabilities, Canada proposes to define a *total asset requirement* from which liabilities are subtracted to determine regulatory required capital



# Implications for Capital

- Capital will become the supervisor's principal focus in measuring solvency
- Supervisors will continue to be interested in quality financial reporting
- It is likely that there will also be a minimum regulatory capital requirement calculated through a factor-based approach similar to (but simpler than) the current MCCR.



# Modifications to MCCSR

- Move to TAR approach
- Refine methodology for credit and asset/liability mismatch risks to reflect changes in financial reporting
  - Mortality risk methodology has been changed to reflect suggestions in the IAA Blue Book
- Introduce allowance for risk diversification and concentration

and more...



OSFI  
BSIF

# Basel Capital Accord II

- Pillar 1 : Minimum Capital Requirements
- Pillar 2: Supervisory Review Process
  - » Can include assessment of overall (economic) capital needs
- Pillar 3: Market Discipline
  - » Enforced through adequate public disclosure

**Most integrated supervisors (but not IAIS)  
make use of the “Pillar” terminology**



# Basel Capital Accord II

Within Pillar 1 there are several levels or approaches:

- **Standardised**
  - In principle, applies to all banks
- **Advanced**
  - Capital calculation more customized to the specific bank\*

\* generally requires pre-approval by the supervisor



# Basel Capital Accord II

- Advanced approaches make use of institution-specific data and methodology, including, possibly, internal models
- Only the largest and/or most technically sophisticated banks will be allowed (in some cases, required) to use Advanced approaches



# Advanced Approaches

- In Canada, both banking and life insurance are very concentrated
  - Each sector is dominated by a few large institutions
- OSFI requires the five largest banks to use Advanced approaches under Basel II
- The three largest life insurers are as large, in terms of market capitalization, as the large banks



# Advanced Approaches

- Not surprisingly, the large life insurers want equal treatment with the banks and have asked that the MCCR be modified to allow them to make use of Advanced approaches, in particular on methods based upon internal models
- The large life insurers are also aware of moves to introduce internal models within Solvency II and within the IAIS solvency framework



# Advanced Approaches

- **OSFI is an integrated regulator and supervises both financial sectors**
  - Since we require the large banks to adopt Advanced approaches under Basel II, it is reasonable to extend this approach to the large insurers
- **OSFI has agreed to work with the industry toward building Advanced approaches and the use of internal models into MCCSR**



# Advanced Approaches

- **To facilitate this, the following structure has been devised:**
  - OSFI oversight committee
  - MCCSR Advisory Committee (MAC)
  - CIA technical sub-committees
  - OSFI technical committees
- **MAC is a joint regulator-industry committee; representation includes**
  - OSFI and AMF (Quebec regulator)
  - Canadian Institute of Actuaries (CIA)
  - CLHIA – industry trade association
  - Assuris – national guarantee corporation
  - The major large life insurers



# **MCCSR Advisory Committee**

## **Mandate**

- **Build consensus on the direction of the new framework**
- **Establish high level principles for the development of the new framework**
- **Provide strategic guidance on technical direction**
- **Assess recommendations on modifications to the capital framework made by the technical groups involved in the process**



# **MCCSR Advisory Committee**

- Has met 15 times since September, 2005
- Has agreed on a set of guiding principles
- Currently working on a Vision Paper that will be shared with interested parties
- Receives progress reports on technical work by the CIA
- Implementation target 2010-2011



# MCCSR Advisory Committee Issues

- Time horizon
- Risk measure
  - VaR, CTE, etc.
  - Model standardization
- Risk pass-through
- Risk mitigation
- Model inputs
  - Data
  - Assumptions
  - Scenario generators
- Models for specific risks
  - Interest rate / ALM
  - Credit
  - Market
  - Insurance
  - Operational
- Modeling of groups
- Calibration
- Model validation and back-testing
- Implementation testing



# Internal Models in MCCSR

Currently used for

- **Valuation of life insurance and annuity policy liabilities**
  - Projections of asset and liability cash flows
  - Deterministic or stochastic scenarios
- **Segregated fund (variable annuity, maturity) guarantees**
  - Present value of cost of honoring the guarantee
  - Stochastic, driven by equity markets



# Internal Models in MCCSR

For segregated fund guarantees

- The model produces a distribution of present values of cost
- Liability and capital values are based upon the CTE (or TailVaR) risk measure
- $\text{CTE}(60) \leq \text{liability} \leq \text{CTE}(80)$
- $\text{TAR} = \text{CTE}(95)$



# Internal Models in MCCSR

For segregated fund guarantees

- Models must be pre-approved
- A strong risk management program is required
- Models must satisfy a “use” test
- Scenario generators must satisfy a calibration test to ensure sufficiently thick tails in the distribution



# Internal Models in MCCSR

## CALM internal models

- Are used by all life insurers in Canada *for valuation of policy liabilities*
- Project asset and policy cash flows for the term of the portfolio
- Determine the current assets required to support a portfolio of insurance or annuity contracts
- Are not required to be pre-approved



# Internal Models in MCCSR

## CALM internal models

- In previous years, industry culture did not provide for extensive controls over and audit of models
  - There are signs this is changing
  - External auditors now are responsible for checking the quality of these models (AuG 43)
  - International Auditing and Assurance Standards Board ISA 540 – exposure draft (comments by April 30, 2007)
- Not clear, at this time, how these models will be treated as Advanced methods are introduced for capital requirements



# Papers on Internal Models

- Both IAIS and IAA are developing papers
- IAIS paper is primarily addressed to supervisors
  - Deals, among other things, with the conditions supervisors could require before the use of internal models is accepted for calculations of required capital
- IAA paper is directed to modellers and is intended to provide guidance in constructing and operating models



# Papers on Internal Models

- These papers are *not* restricted to models used only to calculate Pillar 1 capital requirements
- A “use” test will likely be applied to Pillar 1 models so they will have wider use within insurance companies
- Many companies will use internal models to determine economic capital requirements
  - Supervisors will have oversight over this process through Pillar 2



# **U.K. FSA – ICAS, ICA, ICG**

- **The first Pillar 2 insurance supervisory action concerning internal models**
- **The assumption is that all insurers use internal models to determine their economic capital requirements (ICAS)**
- **FSA examines these models (ICA) and, upon review, provides guidance to individual insurers as appropriate (ICG)**



# Stress Testing

- Financial Condition Reporting (DST, DCAT)
- Fill out tails of distributions used in models
- Handle risks not covered in (Pillar 1) regulatory capital requirements
- An important component of the determination of economic capital



# Risk Management

- First line of defense; capital is the second line
- RM is an integral part of any solvency regime
- Particular attention is paid to RM when advanced approaches are used in regulatory capital
- RM is also a major concern of Pillar 2



# Future Solvency Assessment

- More attention will focus on insurers' necessary and available capital
- As technology and supervisory technique develop, solvency assessment will become more company-specific and appropriate
- Models will be a very important component of the new environment
- This will require extensive thinking, adaptation and training on the part of insurers, supervisors and actuaries





Office of the Superintendent of  
Financial Institutions Canada

Bureau du surintendant des  
institutions financières Canada

**Thank you for your attention**

[www.osfi-bsif.gc.ca](http://www.osfi-bsif.gc.ca)

[allan.brender@osfi-bsif.gc.ca](mailto:allan.brender@osfi-bsif.gc.ca)



OSFI  
BSIF

Canada