Stress Testing: Insurance Companies in Canada

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Presentation to IMF

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Dynamic Solvency Testing

Also known as:

- Dynamic Capital Adequacy Testing (Canada)
- Dynamic Financial Condition Analysis (USA – life)
- Dynamic Financial Analysis (USA – P&C, stochastic)
Evolution of DST

- Canadian financial reporting changed to a GAAP basis
- Actuarial reserves were no longer “good and sufficient” but “appropriate”
- Risk-based capital requirement (MCCSR) was seen as static and retrospective
- There was a need for a dynamic and forward-looking study of a company’s financial condition
Position or Condition?

- *Financial position* is a measure of a company’s current financial state, as measured by its financial statements.

- *Financial condition* is concerned with the state of a company’s financial health, its ability to continue in business.
Dynamic Solvency Testing

- Developed by the Canadian Institute of Actuaries (CIA) in the period 1987-1990
- Required annual test for all Canadian life insurers since 1992
- Required of P&C (general insurance) companies since 1998
What is DST?

• A process whereby the business of the company is tested through cash flow projections into the future under a variety of scenarios of possible (unfavourable) experience

• A process of stress testing
What is DST?

- A process that allows for the testing of possible management strategies for handling adverse experience

- A *risk management* process
How do we do DST?

Construct a computer cash-flow projection module of the company

- Include both assets and products
- Specify future experience factors
- Specify company operating policies
- Provide for revaluation of actuarial liabilities
Model Variables

- External environment – mainly economic, government actions, legal etc.
- Business experience – claims, productivity, sales, surrenders
- Business planning – investment, products, bonus, capital
How do we do DST?

- Select the projection period
- Select the initial position
- Project under a specific scenario of future experience
- Prepare appropriate financial statements for all projection years
- Verify the company’s financial position under this scenario
Projection Period

- Canada:
  - Life insurance – 5 years
  - General (P&C) insurance – at least 2 years

- Period should be sufficiently long so as to allow time for trends to develop and management reaction

- For general insurance, consider the length of the business cycle
The Company Model

• Usually based on a commercial modelling package
• Build the company in the model to reflect its internal organization or the financial reporting organization
The Company Model

- Products
- Assets
- New business
- Investment policy
- Bonus and dividend strategy
- Capital injections
The Company Model

• Check the accuracy of the model:
  – Set the initial position as the position at the end of year Y-2
  – Use the known experience rates of year Y-1 as the scenario assumptions
  – Compare the projected results as of the end of year Y-1 with the known actual position at that time
Operating Policies

• Investment
• Asset/liability matching
• Pricing
• Sales
• Expense control
• Valuation of liabilities
  – Assumptions appropriate to the scenario
• Dividends or bonuses
• New capital
Modelling Scenarios

• A change of scenarios will include a change of projection assumptions and of company policies
• Design the model so as to control and minimize changes necessary for a new scenario
• Use plausible adverse scenarios
Choosing Scenarios

- **Basic risks**
  - Select those that are relevant for the company

- **Test ripple effects**
  - e.g. a change in economic scenario can affect disability rates, expense rates and investment income

- **Integrated scenarios**
  - Combinations of risks
Basic Risks – Life Insurers

- Mortality
- Morbidity
- Persistency
- Cash flow mismatch
- Deterioration of asset values (credit risk)
- New business
- Expense
- Reinsurance
- Government and political action
- Off balance sheet
Basic Risks – General Insurers

- Frequency and severity
- Pricing
- Misestimation of policy liabilities
- Inflation
- Interest rate
- Premium volume
- Expense
- Reinsurance
- Deterioration of asset values (credit risk)
- Government and political action
- Off balance sheet
Selecting scenarios

- Base scenario usually derived from the insurer’s business plan – provides a standard of comparison
- Model management reaction to changes in experience
  - Be realistic about this
- Consider regulatory reaction
Policy Liabilities

- Revalue liabilities within the model using assumptions appropriate to the emerging experience in the scenario
  - Provides for an (indefinite) continuation of adverse scenario experience
  - Necessary to produce appropriate financial statements and measures of capital adequacy
Stochastic DCAT

• It may be desirable to test certain factors with randomly generated scenarios derived from a known distribution
  – Economic variables
  – Claims (general insurance)

• For general insurance, this is DFA
  – Useful for pricing
Stochastic DCAT

- Stochastic methods require greater attention paid to algorithms describing business volume, pricing, expenses, investments, .....
- Data storage becomes a problem
- Use caution in interpreting the results:
  - use appropriate risk measures
  - Remember the technical competence of the reader
The Actuary’s Report

• Directed to senior management and boards of directors
  – The audience does not consist of actuaries; external board members may not have a sound understanding of the insurance business

• Convey meaningful information in a manner that is interesting to the reader
The Actuary’s Report

• More than an analysis of projections
• History of company’s progress – capital ratios for recent years
• Discussion of company’s condition
• For significant scenarios, test possible management reactions
• Make recommendations
• Progress on past recommendations
The Actuary’s Report

• Supply selected financial information
  – balance sheets
  – Income statements

• Discuss regulatory and rating agency implications

• Confirm compliance with professional and regulatory requirements
The Actuary’s Opinion

- CIA standards for satisfactory condition
  - Base scenario: exceed minimum statutory ratio at all times
  - Other scenarios: positive ratio at all times on reported scenarios
- In Canada, the actuary must sign a formal opinion
- The financial condition report is a confidential document
The Canadian Experience

• Wide variation in quality of reports

• Some see this as an important management tool

• Others see this as a compliance issue
OSFI views on DCAT

- OSFI regards financial condition reports as an important risk management tool
- Past surveys indicate less than 50% of reports are of value to an external director
- CIA is revising its paper to provide better guidance to its members
- OSFI will rate reports and use this in its risk rating of the company
Website: www.osfi-bsif.gc.ca