

Property & Casualty Dynamic Capital Adequacy Testing and Stress Testing – The Canadian Framework

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CONSULTANTS + ACTUARIES



Dynamic Capital Adequacy Testing

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- Concept of DCAT
- Risk categories
- Reporting
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■ Regulatory Approach

- Promote understanding and management of risk by companies' boards of directors and senior management
- Establish capital requirements
- Assess performance and strength
- Promote effective disclosure

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■ What is DCAT

- Process of projecting and analyzing the trends of a company's capital adequacy under a variety of future scenarios

■ Purpose of DCAT

- Assist board of directors and senior management in planning and risk management
- Defensive in nature
- Identify
 - ✓ Plausible threats to satisfactory condition
 - ✓ Actions which lessen likelihood of threats
 - ✓ Actions which mitigate a threat if it occurs

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- **Historical Context**

- P&C DCAT since 1998 ; new risk-based capital requirements from 2003

- **Within the Appointed Actuary function**

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▪ DCAT Process

- Development of base scenario
- Identification and examination of possible threats
- Development of plausible adverse scenarios
- Projection and analysis of capital adequacy
- Reporting of results

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■ Base scenario

- Normally, consistent with the business plan
- Realistic assumptions
- Forecast period is usually 3 years for P&C companies
- Software is necessary given the complexity associated with the modeling of insurance operations :
 - ✓ Current and future written premiums and incurred losses
 - ✓ Outstanding losses
 - ✓ Investment portfolio
 - ✓ Expense structure
 - ✓ Taxation

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■ Plausible Adverse Scenarios

- Adverse, but plausible, assumptions about matters to which an insurer's financial condition is sensitive
- Selected adverse scenarios in the range of a 95th to 99th percentile outcome
- Differ among insurers
- May change over time for an insurer

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- **Risk categories – P&C**
 - Claim frequency and Severity
 - Policy Liabilities Risk
 - Inflation Risk
 - Premium Risk
 - Reinsurance Risk
 - Investment Risk
 - Government and Political Risk
 - Off-Balance Sheet Risk
 - Related Company Risk

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▪ Refinements Required

- Integrate scenarios, if the probability of an adverse scenario is high
- Consider ripple effects :
 - ✓ Impact on other base assumptions
 - ✓ Company's response to adversity
 - ✓ Regulatory action, e.g. where minimum capital is not met
 - ✓ Policyholder actions

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■ Reporting

- Primarily for board of directors and senior management
- Copy of report is sent to regulator
- At least base scenario and three most risky scenarios must be tested and reported annually
- Professional opinion is required

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■ Capital Adequacy Targets

- Actuarial standard for satisfactory opinion
 - ✓ Meet minimum regulatory capital requirement under the **base** scenario
 - ✓ Meet all future obligations under the **base** scenario and **all plausible adverse** scenarios
- Regulatory capital requirement:
 - ✓ P&C companies are required, at a minimum, to maintain an MCT ratio of **100%**
 - ✓ Regulator expects each institution to establish a **target** capital level, and maintain ongoing capital, at no less than the supervisory target of **150%**
- Regulator encourages active discussions amongst the actuary, board and management of any scenarios where minimum capital is not met

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■ Calculation of Minimum Capital Test

- Comparison of Capital Required to Capital Available
- Calculation of Capital Required:
 - ✓ Risk factors applied to balance sheet value of assets
 - ✓ Margin for unearned premiums and unpaid claims
 - ✓ Catastrophe reserves
 - ✓ Margin for reinsurance ceded to unregistered reinsurers
- Calculation of Capital Available:
 - ✓ Equity
 - ✓ Capital available reported by regulated financial institutions subsidiaries
 - ✓ Deductions/Adjustments from Capital Available : assets with capital requirement of 100% and balance sheet value of investments in regulated FI subsidiaries



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Risk Categories



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▪ Claim frequency and Severity

- Future claims costs and LR can differ from base scenario due to : single catastrophic event, single large claim, multiple catastrophic events, multiple large claims, other frequency and severity and social inflation.
- Possible ripple effects : insolvency of reinsurers, increases in the policy liabilities, post-event inflation...
- Possible management actions : reviewing reinsurance coverage, implementing rate increase...

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▪ Claim frequency and Severity (examples)

- Loss ratio increase of 65% in 2010 returning to plan value in 2011.
- \$500M earthquake in Western Canada in 2010 accompanied with a 25% reinsurance default in 2010
- 10 large losses of \$10M in 2010

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▪ Policy Liabilities Risk

- Policy liabilities are estimate of future amounts and significant underestimation of these amounts may adversely affect the insurer's financial condition.
- Possible ripple effects : increase in ultimate claim costs and claim expenses in connection with run-off of UPR or with future new business...
- Possible management actions : settling claims faster, implementing rate increase...

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- **Policy Liabilities Risk (example)**
 - 20% Misestimation of year-end 2009 claims liabilities in 2010 and an accompanying 10% increase in loss ratio starting in 2010

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▪ Inflation Risk

- Change in inflation may be due to: increase in the general rate of inflation, increase in the cost of labour and material following a major event, severe recession in economy
- Possible ripple effects : increase in market interest rates, increase in operating expenses...
- Possible management actions : reviewing reinsurance coverage, implementing rate increase, reviewing type of products offered...

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▪ Inflation Risk (example)

- Analysis of Canadian economic data over last 80 years
- A sudden increase of 300bp represents a probability between 1% and 5%
- Accompanied by an increase of 3% of the general expenses and by an increase of 1.5% in interest rates

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■ Premium Risk

- Premium volume could be lower or higher than expected the base scenario
- Possible ripple effects : increase in loss ratio, higher expenses...
- Possible management actions : implementing rate changes, underwriting action in unprofitable markets...

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■ Premium Risk (examples)

- 30% reduction in written premiums, accompanied by an 18% decrease in fixed expenses and a 10% increase in loss ratio in 2010
- 30% increase in written premiums, accompanied by an 40% increase in fixed expenses and a 10% increase in loss ratio in 2010

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■ Reinsurance Risk

- Adverse scenarios arising from reinsurance risk include : reinsurer insolvency, increase in reinsurance rates or reduction in reinsurance commission, reduction in capacity, disputes over policy conditions
- Possible ripple effects : increase in reinsurance rates, reduced availability of reinsurance
- Possible management actions : implementing rate changes, underwriting actions in unprofitable markets...

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- **Reinsurance Risk (example)**

- 50% default of the primary reinsurer and 25% default of the second reinsurer in 2010 accompanied with an increase in reinsurance rates of 50% in 2011

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■ Investment Risk

- Rapid changes in interest rates, exchange rates and economic growth rates can affect the insurer's financial condition
- Possible ripple effects : forced sale or liquidation of assets, positive or negative cash flows impacting company's liquidity position, change in discount rate used to discount policy liabilities
- Possible management actions : selling or reinvesting assets, changing investment strategy...

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▪ Investment Risk (examples)

- Analysis of Canadian economic data over last 80 years
- An increase of 400bp represents a probability between 1% and 5%
- Considering the actual low level on interest rates, a decrease of 25bp

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■ Government and Political Risk

- Rate freeze or rollback of rates by a government body or regulator, nationalization or privatization of a line of business, change to regulations...
- Possible ripple effects : deterioration of loss ratios, increased litigation costs, problem with reinsurance coverage...
- Possible management actions : reducing the volume of business, reviewing the target mix by line of business or jurisdiction, reviewing reinsurance coverage...

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▪ Off-Balance Sheet Risk

- Possible scenarios of off-balance sheet items and their related risks include: structured settlement (credit risk associated with insolvency of annuity company), contingent liabilities or losses (tax, litigation), derivative instruments (market risk, default risk, management risk and legal risk)...
- Possible ripple effects : forced sale or liquidation of assets, positive or negative cash flows affecting insurer's liquidity position
- Possible management actions : selling or reinvesting assets, repositioning of derivative tools, changing reinsurance strategy

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▪ Related Company Risk

- Insurer's financial condition may be sensitive to a reduction in reliance on parent company for financial support, an increase in the provision of financial support to the parent...
- Possible ripple effects : management focus on group rather than company priorities potentially delaying remedial action, need to provide for service disruptions, regulator action to protect local policyholders
- Possible management actions : finding alternative sources of funds, adjusting premium volumes and mix of business...



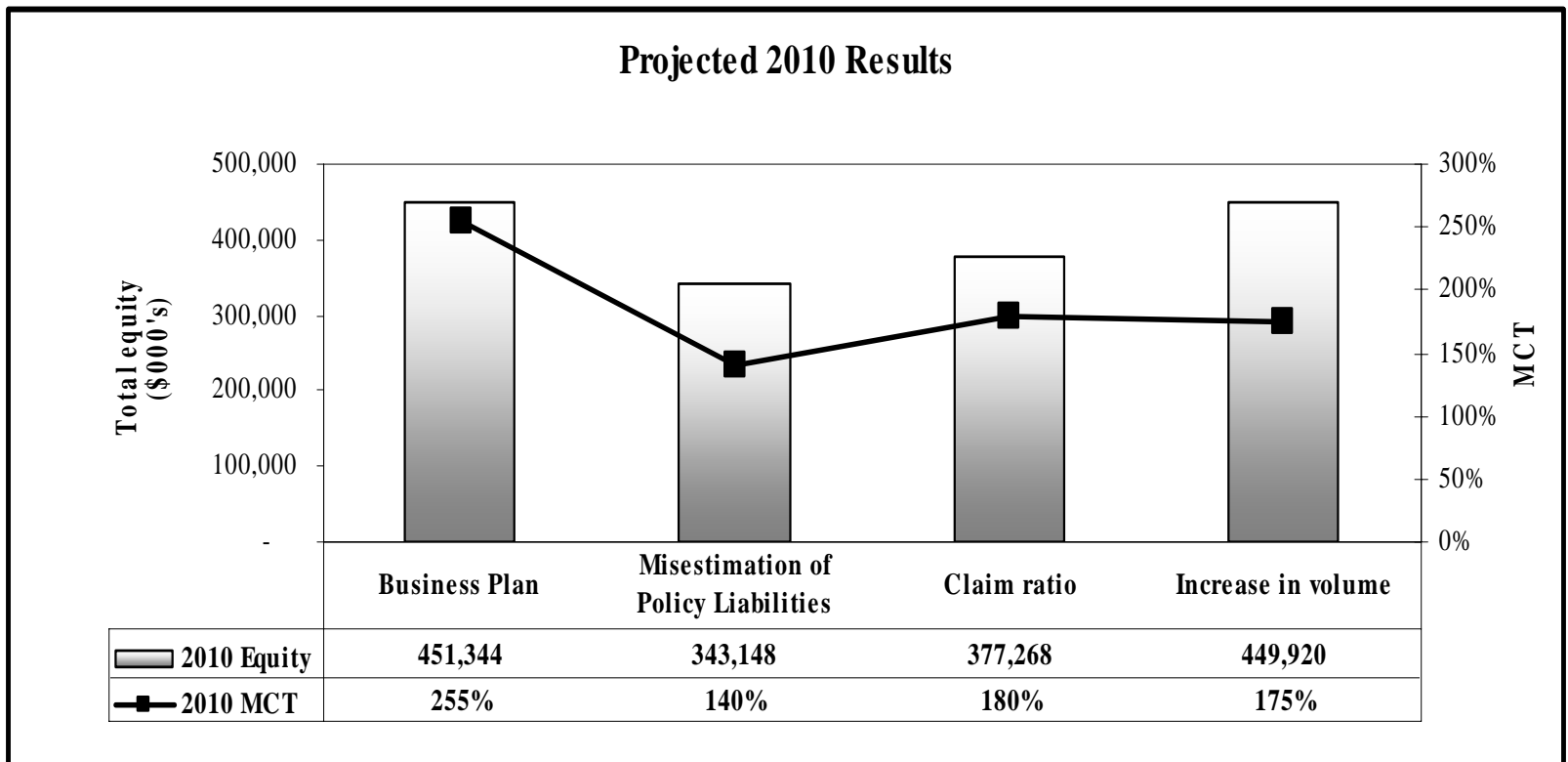
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Reporting



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Results



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- **Opinion**

To the Board of Directors of ABC Insurance Company:

I have completed my annual investigation of the future financial condition of ABC Insurance Company as at December 31, 2008 in accordance with accepted actuarial practice.

I have analyzed the forecasted financial positions of the company during the three-year forecast period under a series of scenarios. A description of these scenarios and their impact on the company is included within this report.

The analysis incorporates assumptions relating to business growth, investments, claims frequency, capital injections, other policy-related experience and other internal and external conditions during the forecast period as well as potential management responses to various plausible adverse scenarios. The most significant assumptions are described within this report.

In my opinion, the future financial condition is satisfactory under these assumptions.



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OSFI E-18 Draft Guideline on Stress testing





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- **OSFI E-18 Draft Guideline on Stress testing**

- Definition of stress testing

- ✓ A technique to evaluate potential effects on an institution's financial condition of a set of specified changes in risk factors, corresponding to exceptional but plausible events

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- **OSFI E-18 Draft Guideline on Stress testing**

- Stress testing as a complementary risk perspective to other risk management tools
 - ✓ Should complement risk quantification methodologies based on complex models that use historical data and estimate statistical relationships
 - ✓ Stress testing can provide insights that validate statistical models at high levels of confidence
 - ✓ Stress testing should allow for simulation of shocks which previously have not occurred
 - ✓ Should help with detection of specific vulnerabilities that could threaten viability
 - ✓ Stress testing should be integral part of capital management programme
 - ✓ Stress testing should be a central tool in identifying liquidity risks

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- **OSFI E-18 Draft Guideline on Stress testing**

- **Role of the Board of Directors**

- ✓ Has ultimate responsibility for stress testing
- ✓ Ensure senior management has a “fit for purpose” , enterprise-wide programme
- ✓ Ensure senior management has adopted policies requiring appropriate use of stress testing as a management tool.
- ✓ Ensure senior management is able to identify and clearly articulate the insurance companies risk appetite and the impact of stress events
- ✓ Senior management must participate in the review and identification of stress scenarios and then participate in developing appropriate risk mitigation strategies.

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- **OSFI E-18 Draft Guideline on Stress testing**

- **Considerations for Stress Testing**

- ✓ Should take account of views from across the organization and cover a range of perspectives and techniques.
- ✓ Insurance companies should have written policies and procedures governing stress testing
- ✓ An insurance company should have a robust infrastructure in place that is sufficiently flexible to accommodate changing stress tests
- ✓ The stress testing framework should be regularly maintained and updated.

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- **OSFI E-18 Draft Guideline on Stress testing**
 - Specific Areas Requiring Focus
 - ✓ Risk Mitigation
 - ✓ Securitization of Risks
 - ✓ Risks to Reputation
 - ✓ Counterparty Credit Risk
 - ✓ Risk Concentrations

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