



CAS Spring Meeting

Update on Canadian Regulatory Capital Requirements

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Agenda

- **Overview of Canadian Regulatory Capital for P&C Insurers**
- **Capital Available**
- **Key Capital Ratios**
- **Capital Required**
 - Credit Risk
 - Market Risk
 - Insurance Risk
 - Operational Risk
 - Diversification
- **Catastrophe Risk**



New Regulatory Capital Framework

- **Minimum capital requirement (100%)**
 - ❑ standardized approach (MCT) will apply to all insurers in Canada
 - ❑ standardized approach is called Minimum Capital Test (MCT) for Canadian incorporated insurers
 - ❑ called Branch Adequacy of Assets Test (BAAT) for foreign companies operating as a branch
- **Target capital requirement (150%)**
 - ❑ Approved insurers allowed to use internal models
 - Subject to limits on reduction of capital for the first few years
 - ❑ Other insurers: standard approach



New Regulatory Capital Framework

CAPITAL AVAILABLE

- **Definition of capital**

CAPITAL REQUIRED

- **Minimum vs. target**
- **Credit risk**
- **Market risk**
- **Insurance risk**
- **Operational risk**
- **Diversification**
- **Catastrophe risk**

New - clear sub-total for each risk; diversification



New Regulatory Capital Framework

Should be read as:

New **Proposed** Regulatory Capital Framework

- This is the *initial stage* of industry consultation on the entire MCT framework
- Industry input into the process is very important



Definition of capital

- **Qualifying criteria for capital instruments**
 - Schedule A for common shares
 - Schedule B for pref. shares – equity
 - Schedule C for pref. shares – debt and sub debt
- **Capital composition limits**
 - Sched. B and C \leq 40% capital available less AOCI*
 - Sched. C \leq 7% capital available less AOCI*
- **Capital component**
 - AOCI* as capital available component
- **Regulatory adjustments**
 - deduct computer software
 - amend treatment of deferred tax allowance (DTA)
 - clarify some existing OSFI interpretations

* Accumulated Other Comprehensive Income (AOCI)



Minimum versus target ratios

2012 minimum reqt's:

- Credit Risk
- Market Risk
- Insurance Risk
- Catastrophe Risk

VS.

2015 reqt's at target:

- Credit Risk
- Market Risk
- Insurance Risk
- Catastrophe Risk
- Operational Risk
- Diversification

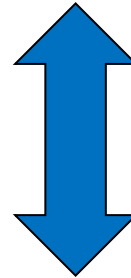


2015 minimum reqt's



Minimum versus target ratios

$$2012 \text{ MCT Ratio} = \frac{\textit{Capital Available}}{\textit{Minimum Capital Required}}$$



$$2015 \text{ MCT Ratio} = \frac{\textit{Capital Available}}{\textit{Minimum Capital Required}}$$



Credit risk - overview

- **Credit risk factors for balance sheet assets**
 - Bumped up some credit risk factors by 1.25 for target level (will be divided by 1.5 for minimum)
 - Left other credit risk factors unchanged
 - Loans: the same risk category as long-term bonds, except for loans to associates
- **Credit risk factors for off-balance sheet exposures**
 - More granular risk factors for LOCs, structured settlements, derivatives and other exposures based on credit rating and term to maturity of the counterparty
 - Applies to uncollateralized portion of the exposure as well as collateral backing the exposure



Credit risk examples

Long-Term Obligations including Term Deposits, Bonds and Debentures & Loans			
Rating	Term to Maturity		
	1 year or less	Greater than 1 year up to and including 5 years	Greater than 5 years
	Risk Factor	Risk Factor	Risk Factor
Government grade	0.00%	0.00%	0.00%
AAA	0.25%	0.50%	1.25%
AA+ to AA-	0.25%	1.00%	1.75%
A+ to A-	0.75%	1.75%	3.00%
BBB+ to BBB-	1.50%	3.75%	4.75%
BB+ to BB-	3.75%	7.75%	8.00%
B+ to B-	7.50%	10.50%	10.50%
Other	15.50%	18.00%	18.00%

Short-Term Obligations including Commercial Paper	
Rating	Risk Factor
Government grade	0.00%
A-1, F1, P-1, R-1 or equivalent	0.25%
A-2, F2, P-2, R-2 or equivalent	0.50%
A-3, F3, P-3, R-3 or equivalent	2.00%
All other ratings, including non-prime and B or C ratings	8.00%

Preferred Shares	
Rating	Risk Factor
AAA, AA+ to AA-, Pfd-1, P-1 or equivalent	3.00%
A+ to A-, Pfd-2, P-2 or equivalent	5.00%
BBB+ to BBB-, Pfd-3, P-3 or equivalent	10.00%
BB+ to BB-, Pfd-4, P-4 or equivalent	20.00%
B+ or lower, Pfd-5, P-5 or equivalent or unrated	30.00%



Market risk - overview

- **Equity risk**
 - 30% risk factor for investments in common equity
- **Real estate risk**
 - No change to perceived risk exposure, current factors adjusted to target
- **Interest rate risk**
 - Final adjustment to the shock factor
- **Foreign exchange risk**
 - Measures the mismatch in foreign currency denominated assets and liabilities
 - New risk measure for Canadian P&C insurers, revised for branches



Market risk – mismatch

- **Interest Rate Risk:**

Dollar fair value change of assets

$$= \text{Fair value of total interest rate sensitive assets} * \text{Duration of assets} * \Delta \text{ yield}$$

Dollar fair value change in liabilities

$$= \text{Fair value of total interest rate sensitive liabilities} * \text{Duration of liabilities} * \Delta \text{ yield}$$

- **Foreign Exchange Risk:**

- 10% of the greater of net open long positions and net open short positions
- If in net open long position for a given currency, can use a carve-out equivalent to 25% of liabilities denominated in the same currency to reduce the charge



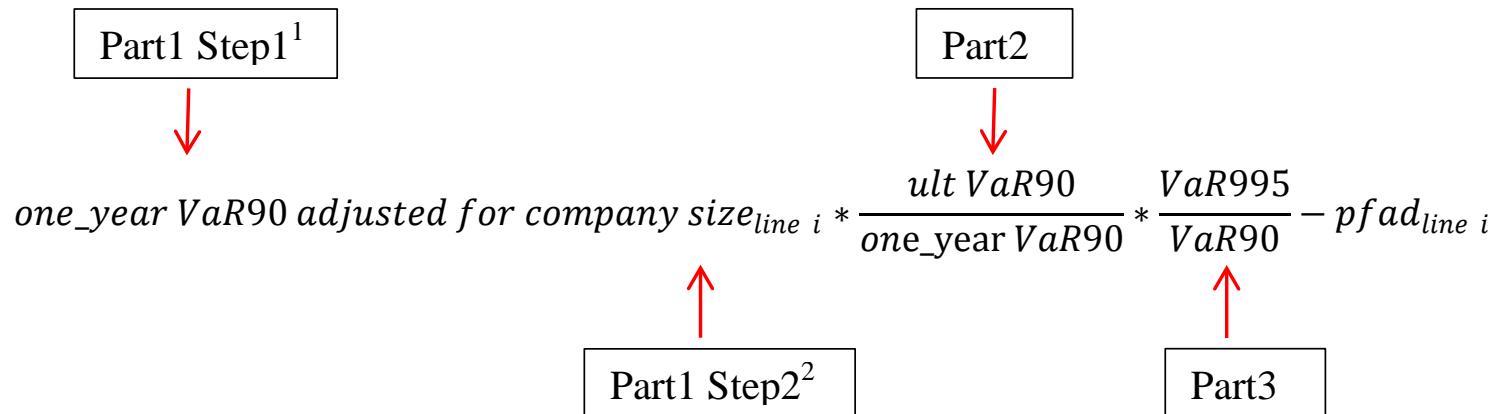
Insurance risk – overview

- **Revised insurance risk factors for premium and claim liabilities:**
 - Updated risk factors for unpaid claims by LOB
 - 4 risk buckets
 - Auto Bodily Injury (BI) & Personal Accident (PA)
 - Property (other lines with subrogation)
 - Other
 - Liability and legal expense
 - Updated risk factors for unearned premiums
 - Will be applied to premium liabilities by LOB
 - 4 same risk buckets (different capital charge)
 - No more capital charge for DPAAE
- **Work reviewed by the CIA & AMF (Quebec)**
- **Mortgage insurance and A&S under review**



Insurance risk: Claim Liability

MCT Factors by line of business (LOB):



VaR – variance or percentile

Ult – Ultimate

Pfad – Provision for Adverse Deviations (Canadian risk margin)



Claim Liability Risk – Part 1

1. **Analyze the variability in one-year development, by line of business, at the 90th percentile. Calculate correlation between lines of business within each company.**
 - Data: Unpaid Claim and Loss Reserve Exhibit (UCLRE)
 - Similar to U.S. schedule P, but not public – filed with Office Of Superintendent of Financial Institutions (OSFI)

Run-off

= [Opening Booked Total Unpaid Losses] - [Closing Booked Total Unpaid Losses + Paid Losses in Year]

for same accident year



OSFI
BSIF

Claim Liability – Part 1 (cont'd)

Step 1: Calculate the variability in one-year run-off by line of business

- Calculation: five one-year run-off data points for each company. The variability in these five data points is calculated assuming the mean run-off is zero, based on the CIA standards that call for use of “best estimate” assumptions.
- Aggregate run-off over all companies of best estimate is “close” to zero
- Combining the results of all companies, VaR90 is calculated for each line of business.



Claim Liability – Part 1 (cont'd)

Step 2: Estimate the impact of company size

- Calculation: A company can be considered an amalgamation of many small identical portfolios. This suggests that the variability is inversely proportional to the square root of company size:

- $\sigma_{A_i} = \sigma_i (\alpha_i + \beta_i / \sqrt{n_A})$

where,

σ_{A_i} = Variability in one-year run-off in line i of company A ,

σ_i = Variability in one-year run-off of the smallest company in the selected dataset,

n_A = The size variable based on the relative size of the companies' claim liabilities

Fitting a regression line to the data, α_i and β_i are estimated for each line of business.



Claim Liability – Part 1 (cont'd)

Step 3: Adjust for impact of company size

- The variability for the industry is estimated by substituting σ from the formula in Step 2 with the VaR90 calculated in Step 1. A large n is selected by considering,
 - An average of the largest 4 companies' n values
 - Total n for all selected companies
 - The intercept, i.e. $1/\sqrt{n} = 0$
- The final VaR90 in one-year run-off, adjusted for impact of company size, is judgmentally selected from these results. This step is repeated for each line of business.



Claim Liability – Part 1 (cont'd)

Correlation within a company

The data for the UCLRE is available by line; A_i , as well as in total, A . By assuming that the correlation between lines within a company is the same, an estimate of the coefficient of correlation, ρ , is calculated for each company, based on:

$$\sigma_A^2 = \sum_{i=1}^n \sigma_{A_i}^2 + 2\rho \sum \sum_{i < j} \sigma_{A_i} \sigma_{A_j} .$$

Median estimate of correlation (ρ) was close to 50%.

But:

- Significant differences between companies
- Some evidence of tail correlation close to 1

Conclusion:

- Explicit correlation is too generous based on evidence
- Implicit correlation is necessary to avoid conservatism



Claim Liability Risk – Part 2

Basic paradigm is a one year run-off (as part 1) with a conservative risk adjusted provision at end of one year

- No definitive approach in the literature for this
- 2. Determine the relationship between the one-year excess/deficiency ratio and the ultimate excess/deficiency ratio, at the 90th percentile.
 - Data: OSFI page 60.40 of annual return
 - Similar to a five year schedule P
 - but only for all lines combined
 - Analysis is driven by longer tail lines
 - Judgmental reductions for shorter tail lines



Claim Liability – Part 2 (cont'd)

Step 1: Calculate One-Year Excess/Deficiency Ratio

- The data used is the Excess/Deficiency Ratio found on Page 60.40 for the five year-ends 2007 to 2011, for each company. Using these five data points the VaR90 is calculated.

Step 2: Calculate Ultimate Excess/Deficiency Ratio

- The data used are the amounts found on Page 60.40 at year-end 2011 for each company.
- Using this data, three triangles are constructed, cumulative paid, incurred, and booked triangles.
- Using two stochastic methods, Log Normal and Bootstrap, generated for each triangle, and the VaR90 calculated.

Step 3: Calculate ratios

- The ratio [Ultimate Excess/Deficiency Ratio] / [One-Year Excess/Deficiency Ratio] is calculated



Claim Liability Risk – Part 3

90th percentile used for the preceding steps due to:

- Limited number of companies with clean data
- Limited number of years of run-off data
- Need to adjust to 99.5th percentile for capital target

3. Determine the relationship between the 90th percentile and the 99.5th (or other) percentiles.

- Data: General Insurance Statistical Association data

Step 1: Organize GISA data

- Triangles used in our analysis are for each combination of Region, Line, and Coverage, where,
 - Region = Ontario, Alberta, Atlantic, and Territories,
 - Line = Commercial Auto, Private Passenger Auto, and Motorcycles
 - Coverage = Auto Liability, Personal Accident, Other



Claim Liability – Part 3 (cont'd)

Step 2: Stochastic Methods

- The Bootstrap and LogNormal stochastic methods are used to generate ultimate losses estimates (for all 20 accident years combined) for each triangle.

Step 3: Results

- μ , σ , VaR90, and various VaR percentiles are calculated.
- The ratio $[(\text{Var99.5} - \mu) / \mu] / [(\text{VaR90} - \mu) / \mu]$, is used.
- ❖ As public data, AMF and CIA could perform their own analysis.
- ❖ Significant variation in estimates of various percentiles depending on methods and practitioners
- ❖ However, ratio above was very consistent
 - ❖ Ratio was not inconsistent with a normal approximation!



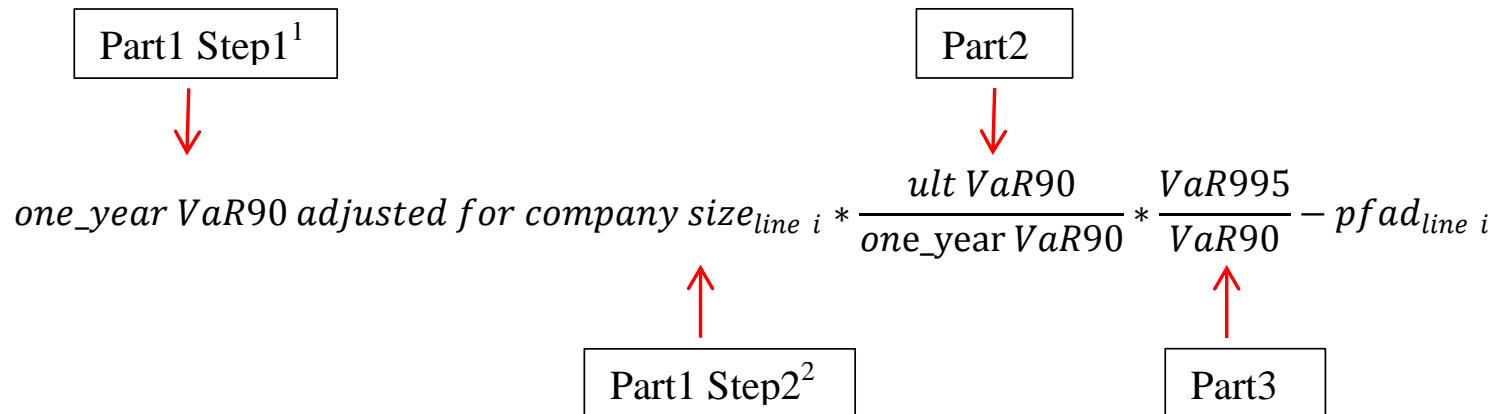
Insurance risk: Premium Liability

- **Determine VaR 99.5 variability in ultimate loss ratios by line of business for each accident year**
- **Apply risk factors to premium liabilities excluding PfADs by line of business**
- **No more 8% of Unearned Premium (UEP) plus 35% of premium deficiencies and DPAE**
 - UEP recognizes revenues over policy term to match Deferred Policy Acquisition Expenses (DPAE), and is not intended to be an estimate of future cash flows
 - Upcoming IFRS standard changes may affect UEP and DPAE might disappear

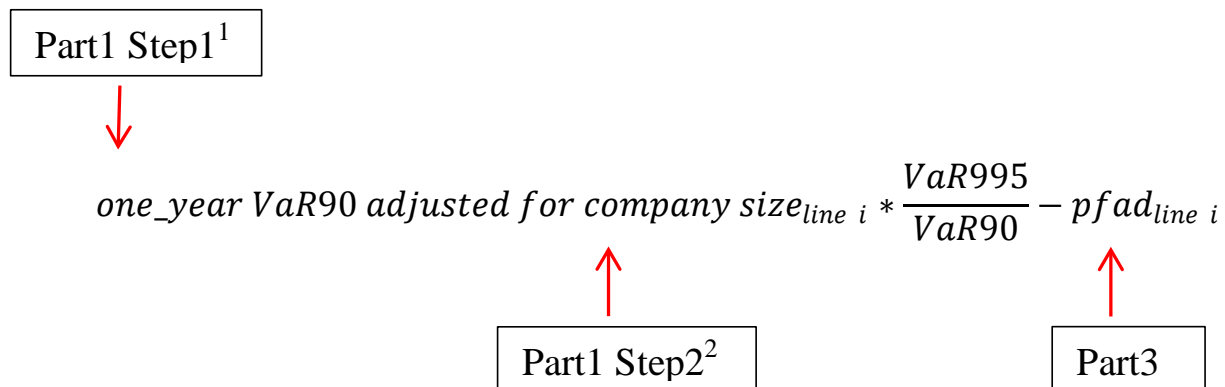


Comparison of Claim and Premium Liability math

Claim Liability Steps



Premium Liability Steps



Adjusting premium liability for development to ultimate would have led to double counting.



Insurance risk: Unearned Premiums Ceded and O/S Losses Recoverable from Unregistered Reinsurers

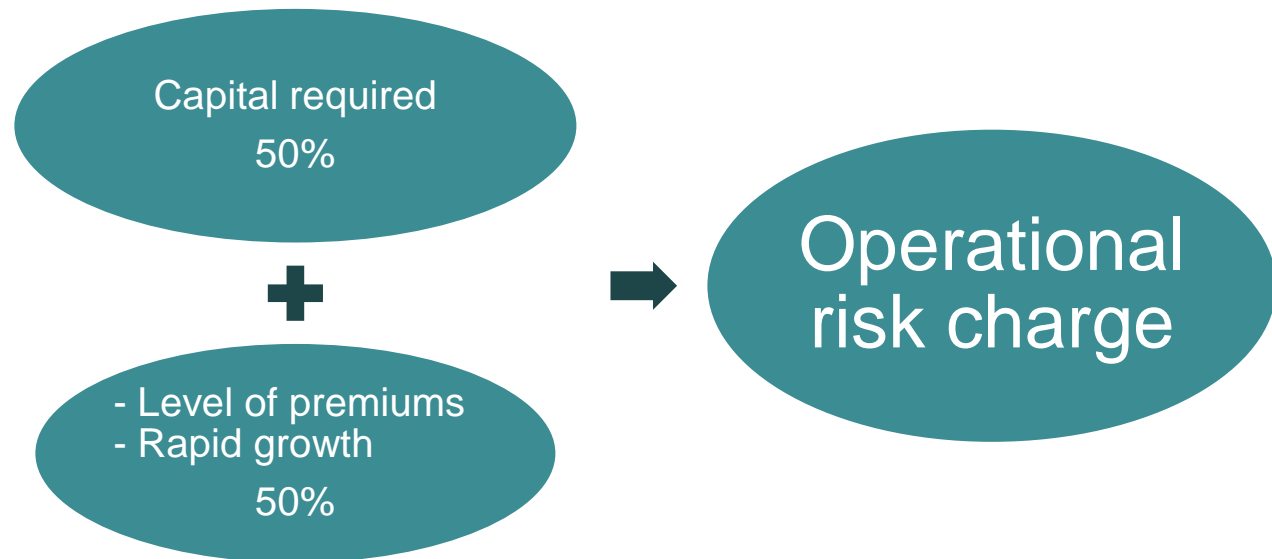
Simple methods are designed to approximate averages of methods above

- **Current claim risk 10% derived from average UEPR (8%) and unpaid claims (5%, 10%, 15%)**
 - Factors above are at minimum level (100% MCT)
- **Proposed based on same methodology at target level**



Operational risk - overview

- **New explicit measure in the MCT**
- **Components:**

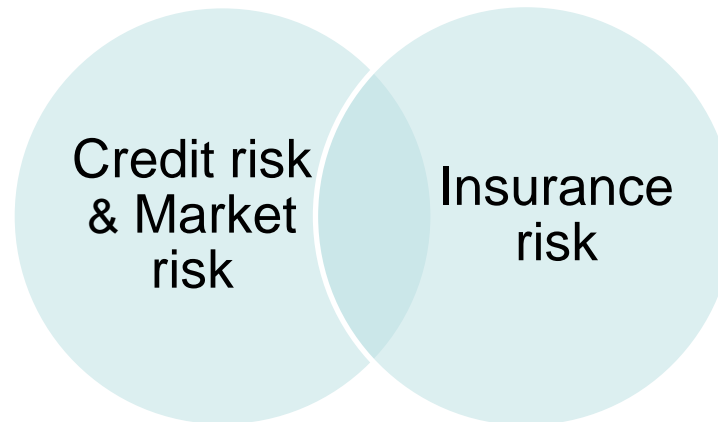


- **Subject to a cap**



Diversification credit

- **Within a risk category**
 - insurance risk
 - implicit: within updated risk factors
- **Between risk categories**
 - {credit risk + market risk} and insurance risk
 - using a basic square root of sum of squares formula



Catastrophe risk

- **Earthquake risk**
 - Final Guideline B-9 issued in Feb 2013
 - Separated best practices/governance (B-9) from financial resource requirements (MCT)
 - OSFI agreed to continue discussions re: EQ exposure measure
 - created industry working group
 - from formula “greater of QC and BC” to “Canada-wide”
 - finding solution to account for increased exposure but also to avoid super-additivity problem



What's new in B-9?

- **More explicit principles-based approach (like B-3 reinsurance guideline)**
- **Update the description of best practices**
- **OSFI's flexibility in collection of data**
 - details to be decided
- **Move EQ reserve calculation to MCT guideline section**



Revised B-9 provides 5 principles on the following items:

- 1. Earthquake Exposure Risk Management**
- 2. Earthquake Exposure Data**
- 3. Earthquake Models**
- 4. Probable Maximum Loss (PML) Estimates**
- 5. Financial Resources and Contingency Plans**



PRINCIPLE 1 – EARTHQUAKE EXPOSURE RISK MANAGEMENT

Insurers should have a sound and comprehensive earthquake risk management policy that is subject to oversight by the Board of Directors and is implemented by senior management.



PRINCIPLE 2 – EARTHQUAKE EXPOSURE DATA

Earthquake exposure data needs to be appropriately captured and regularly tested for consistency, accuracy and completeness.



PRINCIPLE 3 – EARTHQUAKE MODEL

Earthquake models should be used with a sound knowledge of their underlying assumptions and methodologies, as well as with a high degree of caution that reflects the significant uncertainty in such estimates.

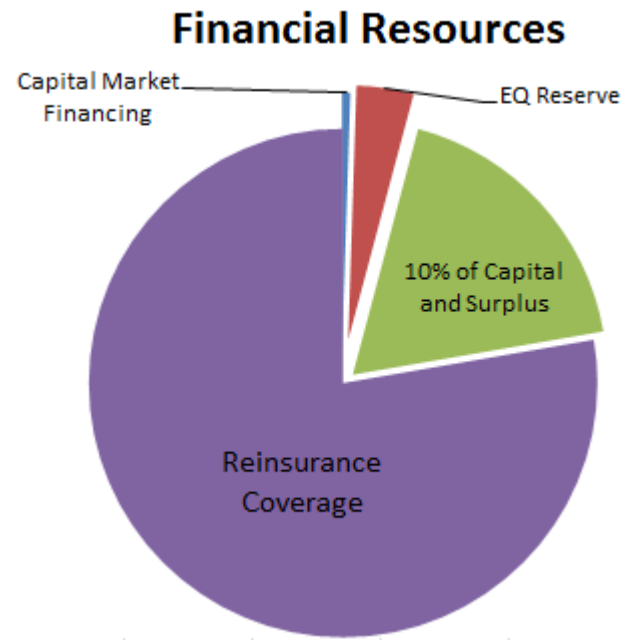
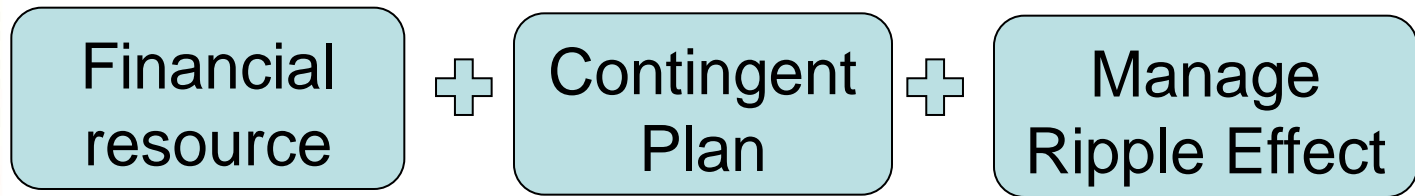


PRINCIPLE 4 – PML ESTIMATES

PML estimates should properly reflect the total expected ultimate cost to the insurer, including considerations for data quality, non-modelled exposures, model uncertainty and exposures to multiple regions.



Principle 5: To manage through a major EQ successfully, you need



Self-assessment (cover letter)

- All insurers are asked to complete a self-assessment of their practices compared with this guideline by September 30, 2013.
- The Board should review and discuss the self-assessment, together with the earthquake exposure risk management policy, prior to January 1, 2014
- When a self-assessment identifies potential gaps, a plan appropriate to the insurer to response to the gaps should be developed and presented with the self-assessment.
- Insurer should keep OSFI Relationship Manager up-to-date on their progress
- Self-assessment and implementation plan is available to OSFI on request



New Regulatory Capital Framework

Timetable

- **May 2013: QIS and discussion paper for comments**
- **August 2013: EQ Resource Requirement and annual reporting form consultation**
- **November 2013: draft MCT Guideline for consultation (includes final EQ Resource Requirement)**
- **January 1, 2014: Earthquake Guideline effective**
- **Summer 2014: final MCT Guideline**
- **January 1, 2015: MCT Guideline effective date**



Communication strategy

- **CCIR Capital Requirements Information Committee**
- **AMF**
- **CIA Risk Management and Capital Requirements Committee for insurance risk**
- **Industry consultation**
 - Discussion paper and QIS (mid/end July 2013)
 - OSFI open to meet with industry if required
 - Draft 2015 MCT Guideline (November 2013)
 - Provide rationale for OSFI's decisions regarding comments received



Questions ?

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