

**Status Update on  
Stochastic Based BCAR**

**P/C and L/H:  
BCAR-The New Generation**

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# Purpose of Webinar



- Informational
- Improve direct communication
- Set expectations
- Provide ongoing status updates of the project

# Agenda

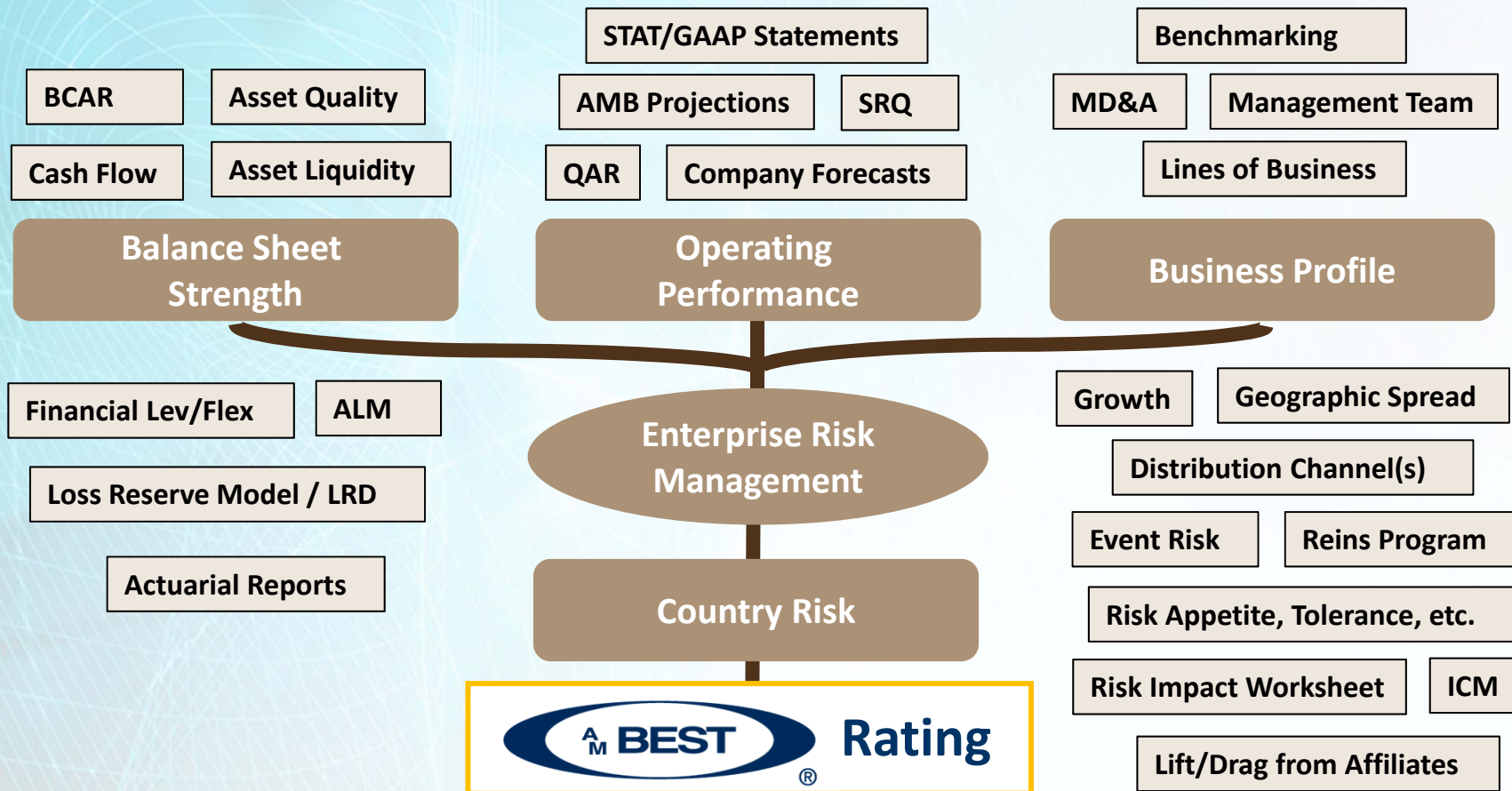


- AMB Rating Methodology – role of BCAR in the determination of a credit rating
- Current BCAR structure
- Reasons for proposed changes
- Overview of proposed changes & work to date
- Preliminary observations
- Next Steps
- Proposed implementation time frame

# General Rating Process



What is the relationship between BCAR and a rating level?



# How is BCAR Used?



- As an analytical tool
- Indication of current balance sheet strength
- Proforma projections
- Stress tests...Natural Cats...Terrorism
- Other what if scenarios
  - Changes to reinsurance
  - Business acquisition or disposition
  - Changes in asset (or liability) mix
  - US government default

# Current Structure – PC BCAR



$$\text{BCAR Ratio} = \text{Adjusted Surplus} / \text{Net Required Capital}$$

## Adjusted Surplus (APHS)

Reported Surplus (PHS)

Equity Adjustments:

Unearned Premiums (DAC)

Equalization/Contingency Reserves

Loss Reserves

Assets

Debt Adjustments:

Surplus Notes

Debt Service Requirements

Other Adjustments:

Future Operating Losses

Potential Catastrophe Loss

Future Dividends

Goodwill

Other Intangible Assets

Minority Interests, etc.

## Net Required Capital

Gross Required Capital (GRC):

(B1) Fixed Income Securities

(B2) Equity Securities

(B3) Interest Rate

(B4) Credit

(B5) Loss and LAE Reserves

(B6) Net Premiums Written

(B7) Off-Balance Sheet

Covariance Adjustment

Net Required Capital (NRC)\*

$$*\text{NRC} = \text{SQRT} [ (\text{B1})^2 + (\text{B2})^2 + (\text{B3})^2 + (0.5 * \text{B4})^2 + [(0.5 * \text{B4}) + \text{B5}]^2 + (\text{B6})^2 ] + \text{B7}$$

# Current Structure – LH BCAR



$$\text{BCAR Ratio} = \text{Adjusted Surplus} / \text{Net Required Capital}$$

## Adjusted Surplus (APHS)

Reported Surplus (PHS)

Equity Adjustments:

AVR Reserves

Interest Maintenance Reserve

Unearned Premiums (DAC)

Debt Adjustments:

Surplus Notes

Debt Service Requirements

Other Adjustments:

Future Operating Losses

Future Dividends

Derivatives Off Balance Sheet

Goodwill

Other Intangible Assets

Minority Interests, etc.

## Net Required Capital

Gross Required Capital (GRC):

(C1) Asset Risk

(C2) Insurance Risk

(C3) Interest Rate/Market Risk

(C4) Business Risk

Covariance Adjustment

Net Required Capital (NRC)\*

$$*\text{NRC} = \text{SQRT} [ (\text{C1NonEq} + \text{C3interest})^2 + (\text{C1Eq} + \text{C3market})^2 + (\text{C2})^2 ] + \text{C4}$$



# Reasons for Proposed Changes



- More sophisticated and faster software available now
  - Simulations / probability curves
  - Economic scenario generators (ESGs)
  - Correlations / diversification
  - Company specific detail
    - Assets
    - Reinsurers
    - Profitability
    - Volatility

# Reasons for Proposed Changes



- Metrics better understood and utilized by industry
  - Tail Value at Risk (TVaR)...aka Conditional Tail Expectation (CTE)
    - ✓ Average loss beyond a given threshold
    - ✓ Threshold is a percentile (ie 99%)
    - ✓ Considers size of losses beyond threshold (Financial Strength)
  - Value at Risk (VAR) ... aka Probability of Default
    - ✓ Probability loss will exceed a given threshold
- Consistent confidence intervals across risks
  - 95%, 97.5%, 99%, 99.5%, 99.9%

# Reasons for Proposed Changes



- Consistent Time Horizon for risk factors
  - Runoff to Ultimate basis for PC UW capital factors
    - ✓ Protects policyholders & claimants
    - ✓ No change from current view
  - Some risks will need to use duration of liabilities as indicator for ultimate risk
    - ✓ Credit risk on recoverables
  - Bonds – duration of bonds
  - Common stocks – one year

# Overview of Proposed Changes & Work to Date



- Do not intend to change underlying view of the risks
  - Bonds – default risk
  - Common stock – price volatility
  - Reinsurance credit risk – uncollectible recoverables
  - Pricing risk – potential for UW loss on business written next year
  - Reserve risk – potential for unanticipated adverse reserve development
- Do not intend to change the main structure of the model
- Goal is to generate risk factors using stochastic simulations from probability curves

# Overview of Proposed Changes & Work to Date



## ○ Phase 1 – Bonds

- Use Economic Scenario Generator
- Update ***bond default*** risk factors
  - ✓ Reflect duration of company's bond portfolio (SRQ)
  - ✓ Reflect asset quality of company's bond portfolio (SRQ)
  - ✓ Reflect volatility in bond default assumptions (stochastic portion - tied to ESG)
  - ✓ Can offset default with recovery on defaults (vary by rating?)
  - ✓ TVaR metric – (currently 5 year, 5% probability of ruin)
  - ✓ VaR metric?

# Overview of Proposed Changes & Work to Date



## Bond Quality & Maturity SRQ question:

3b. FIXED INCOME PORTFOLIO ANALYSIS: Please complete the following Quality and Maturity Distribution of All Bonds Owned as of December 31, 2013. Please show US Governments on line 18, and show Parents, Subsidiaries, and Affiliates on line 19. Dollar amounts should be stated at Book/Adjusted carrying values (in \$000s). Number of Issuers should be provided in whole numbers and represents the number of bond issuers associated with the dollar amount of bonds expiring at that maturity date and rating.

| (01)<br>Rating (or equivalent to rating)  | Maturing in 1 Year of Less |                           | Maturing in Over 1 Year Through 3 Years |                           | Maturing in Over 3 Years Through 5 Years |                           | Maturing in Over 5 Years Through 10 Years |                           | Maturing in Over 10 Years Through 20 Years |                           | Maturing in Over 20 Years |                           | Total                  |
|---|----------------------------|---------------------------|---|---------------------------|--|---------------------------|---|---------------------------|--|---------------------------|---------------------------|---------------------------|------------------------|
|   | (02)<br>Amount (\$000)     | (03)<br>Number of Issuers | (04)<br>Amount (\$000)                  | (05)<br>Number of Issuers | (06)<br>Amount (\$000)                   | (07)<br>Number of Issuers | (08)<br>Amount (\$000)                    | (09)<br>Number of Issuers | (10)<br>Amount (\$000)                     | (11)<br>Number of Issuers | (12)<br>Amount (\$000)    | (13)<br>Number of Issuers | (14)<br>Amount (\$000) |
| 1. AAA                                    |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 2. AA+                                    |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 3. AA                                     |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 4. AA-                                    |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 5. A+                                     |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 6. A                                      |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 7. A-                                     |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 8. BBB+                                   |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 9. BBB                                    |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 10. BBB-                                  |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 11. BB+                                   |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 12. BB                                    |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 13. BB-                                   |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 14. B+ to B-                              |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 15. CCC+ to CCC-                          |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 16. CC to C                               |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 17. D (in or near default)                |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 18. U.S. Governments*                     |                            | X X X                     |   | X X X                     |  | X X X                     |   | X X X                     |  | X X X                     |                           | X X X                     |                        |
| 19. Parents, Subsidiaries, & Affiliates** |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 20. All Other                             |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |
| 21. TOTAL (Lines 1 through 20)***         |                            |                           |   |                           |  |                           |   |                           |  |                           |                           |                           |                        |

\*Row 18 Column 14 Total should match NAIC annual statement Schedule D Part 1A Section 1 Line 1.7 Column 6 (divided by 1000).

\*\*Row 19 Column 14 Total should match NAIC annual statement Schedule D Part 1A Section 1 Line 8.7 Column 6 (divided by 1000).

\*\*\*Row 21 Column 14 Total should match NAIC annual statement Schedule D Part 1A Section 1 Line 9.7 Column 6 (divided by 1000).

# Overview of Proposed Changes & Work to Date



- Phase 1 – Common Stock
  - Use Economic Scenario Generator
  - Update **common stock** risk factors
    - ✓ Reflect type of stocks held by company (SRQ – Beta)
    - ✓ Reflect volatility (stochastic portion – tied to ESG)
    - ✓ Can cap simulated downside risk
    - ✓ TVaR metric – (currently 1% EPD, 1 year)
    - ✓ VaR metric?

# Overview of Proposed Changes & Work to Date



## Common Stock Beta SRQ Question:

### I. ASSET SECTION (Continued)

**3c. COMMON STOCK PORTFOLIO ANALYSIS:** Please enter the "Beta" and the associated "R-Squared" of your company's publicly traded common stock portfolio as of December 31, 2013 (including publicly traded Parent, Subsidiary, and Affiliated common stock). The "Beta" represents the level of movement in the market value of common stocks owned relative to the stock market as a whole over a specified period of time. "R-Squared" measures how reliable the calculated "Beta" is.

The stock portfolio should be separated based upon the country of the exchange in which the stock is traded. If a stock is traded on exchanges in multiple countries, only include it in one of the countries. If the total market value of the common stocks that are traded in a particular country is less than 5% of the rating unit's total publicly traded common stock portfolio market value, then a response for that country is not required.

Please use the Aggregate Method to calculate the portfolio Beta based upon the specified index shown. The Aggregate Method portfolio Beta at year end is determined by a simple linear regression using 52 weeks of time weighted rates of return for the entire portfolio. When using the value of the publicly traded common stock portfolio in the calculation of the Beta, do not include the effects of any hedging on the portfolio. For companies that do not want the administrative expense of calculating the portfolio Beta, please enter a Beta of 1.50 and R-Squared of 1.00 along with the market value of the common stocks in that portfolio.

#### Publicly Traded Common Stocks

| (01)<br>Location of Domestic Exchange<br>on which Common Stocks are Traded | (02)<br>Market Value<br>@12/31/2013<br>(in \$000s) | (03)<br>Beta | (04)<br>R-Squared | (05)<br>Index<br>Used to Calculate<br>Beta & R-Squared |
|--|--|--------------|-------------------|--|
| 1. United States of America  |  |              |                   | S&P 500  |
| 2. Canada  |  |              |                   | S&P/TSX Composite                                      |
| 3. United Kingdom  |  |              |                   | FT All Shares  |
| 4. Japan   |  |              |                   | TOPIX  |
| 5. Other (please specify)  |  |              |                   | Please specify:  |
| 6. Other (please specify)  |  |              |                   | Please specify:  |
| 7. Other (please specify)  |  |              |                   | Please specify:  |
| 8. TOTAL (Lines 1 through 7)   |  | X X X        | X X X             | X X X  |



# Overview of Proposed Changes & Work to Date



## ○ Phase 1 – Reinsurance

### • Update **reinsurance credit** risk factors

- ✓ Reflect type of recoverable (paid, unpaid, upr)
- ✓ Reflect rating of each reinsurer (Schedule F/S and ratings data)
- ✓ Reflect duration of recoverables
- ✓ Can reflect partial recovery when reins defaults
- ✓ Simulate 10,000 scenarios for each reinsurer
- ✓ Reflects concentration risk
- ✓ TVaR metric (currently based on FSR)
- ✓ VaR metric?

# Overview of Proposed Changes & Work to Date



- Phase 1 – PC Premium
  - Update PC ***premium risk*** factors
    - ✓ Create Industry UW Loss probability curves
      - 21 Schedule P lines and 4 NPW size categories (VS,S,M,L)
      - 84 industry probability curves for premiums
    - ✓ Use company NPW size to select industry probability curve
      - use company profitability to adjust curve
    - ✓ Simulate 10,000 UW profit/loss scenarios for each line
    - ✓ Reflect diversification across lines
      - use one of 4 industry correlation matrices
      - based on size of company's total NPW (VS,S,M,L)
    - ✓ Risk factors based on TVaR metric (currently 1% EPD – ultimate)
    - ✓ VaR metric?

# Overview of Proposed Changes & Work to Date



## ○ Phase 1 – PC Reserves

### • Update **PC reserve** risk Factors

- ✓ Create industry unanticipated adverse development probability curves
  - 21 Schedule P lines and 4 reserve size categories (VS,S,M,L)
  - 84 industry probability curves for reserves
- ✓ Use company Reserve size to select industry probability curve
  - use company volatility to adjust curve
- ✓ Simulate 10,000 reserve development scenarios for each line
- ✓ Reflect diversification across lines
  - use one of 4 industry correlation matrices
  - based on size of company's total net reserves (VS,S,M,L)
- ✓ Risk factors based on TVaR metric (currently 1% EPD – ultimate)
- ✓ VaR metric?

# Overview of Proposed Changes & Work to Date



- Phase 1 – Natural Catastrophe
  - Update ***natural catastrophe*** approach
    - ✓ Var or TVaR metric?
    - ✓ Occurrence vs. aggregate season?
    - ✓ Total all perils?
    - ✓ Currently different VaRs for EQ and Wind
    - ✓ Straight charge to PHS or add to NRC?
    - ✓ Confidence level?
    - ✓ Continue stress test approach?

# Potential Structure – PC BCAR



$$\text{BCAR Ratio} = \text{Adjusted Surplus} / \text{Net Required Capital}$$

## Adjusted Surplus (APHS)

Reported Surplus (PHS)

Equity Adjustments:

Unearned Premiums (DAC)

Equalization/Contingency Reserves

Loss Reserves

Assets

Debt Adjustments:

Surplus Notes

Debt Service Requirements

Other Adjustments:

Future Operating Losses

Potential Loss

Future Dividends

Goodwill

Other Intangible Assets

Minority Interests, etc.

## Net Required Capital

Gross Required Capital (GRC):

(B1) Fixed Income Securities

(B2) Equity Securities

(B3) Interest Rate

(B4) Credit

(B5) Loss and LAE Reserves

(B6) Net Premiums Written

(B7) Off-Balance Sheet

**(B8) Catastrophe Exposure**

Covariance Adjustment

Net Required Capital (NRC)\*

$$*\text{NRC} = \text{SQRT} [ (\text{B1})^2 + (\text{B2})^2 + (\text{B3})^2 + (0.5 * \text{B4})^2 + [(0.5 * \text{B4}) + \text{B5}]^2 + (\text{B6})^2 ] + \text{B7} + \text{B8}$$

# Example of Impact to PC Model



## Current Calculation

APHS (ex Potential Cat Losses) = \$150M

Potential cat Losses = \$30M

NRC = \$80M

$$\text{BCAR} = \frac{(150-30)}{80} = \frac{120}{80} = 150$$

## Potential Calculation

APHS (ex Potential Cat Losses) = \$150M

Potential cat Losses = \$30M

NRC = \$80M

$$\text{BCAR} = \frac{150}{(80+30)} = \frac{150}{110} = 136$$

# Overview of Proposed Changes



- Phase 2
  - Remaining asset classes
  - Life and annuity risks
    - ✓ Mortality
    - ✓ Longevity
    - ✓ Disintermediation
    - ✓ Product Guarantees
    - ✓ Long Term Care/Disability
  - Change net required capital formula to correlation matrix approach (instead of the square root rule)

# Observations



- Investments
  - Greater risk than previous considered
  - Particularly in equities
- Reinsurance
  - Initial charges came out high and this is being reviewed
- PC Underwriting (Reserves and Premium)
  - Auto is coming out lower – not surprised by this
  - Made sure we are not double counting catastrophe charge
  - TVaR very high at high confidence levels
  - More differentiation between lines of business
  - By line correlation matrices – no real surprises
- BCAR Guidelines
  - May need to change



# Observations



- **Next generation BCAR** as an indication of current balance sheet strength...what do scores say about relative financial strength?

|           | <u>95%</u> | <u>98%</u> | <u>99%</u> |
|-----------|------------|------------|------------|
| Company A | 178 (A++)  | 111        | 83         |
| Company B | 178 (A++)  | 126        | 103        |
| Company C | 152 (A)    | 128        | 116        |

# Observations



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# Observations



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|           | <u>95%</u> | <u>98%</u> | <u>99%</u> |
|-----------|------------|------------|------------|
| Company A | 178 (A++)  | 111        | 83         |
| Company B | 178 (A++)  | 126        | 103        |
| Company C | 152 (A)    | 128        | 116        |

# Observations & Next Steps



- TVaR
  - Issues with catastrophe losses and the impact of extreme tail events
  - May go beyond what is needed from BCAR
- Further review needed
  - Does VaR provide sufficient information?
- Next Steps
  - Continue to evaluate TVaR based output (Life and Universal models)
  - Also evaluate VaR based output
  - Additional discussions with key industry constituents
  - Begin to develop Draft Criteria

# Expected Timeline



- Model being developed in phases
  - Phase 1 built – testing internally with 2013 YE data
    - ✓ Initial Parameters completed
    - ✓ Run parallel BCARs (PC; LH; Universal) internally with 2014 YE data
    - ✓ Draft criteria expected to be released this summer for comment
    - ✓ We do anticipate sharing 2014 YE output with companies as draft criteria are released
    - ✓ **Time frames for final criteria release will be impacted by comments received on criteria, changes based on comments, & LH impact study**
  - Phase 2 – 1 year after Phase 1 finalized

# Thank You!



## Questions/Comments?

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