

## Principles-Based Reserving

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## Principles-Based Valuation Project

- Thomas Hampton
  - What is it, why do we need it, what will it do for consumers, industry and regulators
- Dave Sandberg
  - Primer on Principle-Based Reserves

## Principles-Based Valuation Project

- What is it?
  - New calculation methodology that captures all material risks by establishing reserves based on a magnitude of risks, unlike the current formula approach.
- Why do we need it?
  - Good public policy
  - Eliminate flaws in current Formula-Based Reserve Methodology
  - Allows U.S. to compete in the Global Insurance Market
- What will it do for consumers, industry and regulators?

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## PRINCIPLE-BASED RESERVING

*Dave Sandberg, FSA, MAAA*  
*American Academy of Actuaries*

## Agenda for this Session

- Overview of the Academy's Role
  - Including qualification of the actuary
- Primer on Principle-Based Reserves
  - Including experience studies
- How PBR Compares to International Solvency Approaches

## American Academy of Actuaries

**Mission: The Academy's mission is to serve the public on behalf of the United States actuarial profession**

- Provides independent and objective actuarial analysis
- Identifies and addresses issues where actuarial science provides a unique understanding
- Provides high professional standards of actuarial qualification, practice, and conduct

## Life Practice Council (LPC)

- Principle-Based Reserve Work Groups
- Other LPC Groups supporting PBR
- Risk-Based Capital Work Groups

PBR = Principle-based reserves  
PBA = Principle-based approaches, which can apply to  
both PBR and principle-based RBC

## Future Focus of LPC

- Continued Development
- Education
- Implementation
- Practice Issues

## Why is the Actuary Qualified to do PBR?

- Education
  - Basic and Continuing
- Experience
- Professional Standards
  - Code of Professional Conduct

### Credentials for Life and Health Actuaries

ASA	= Associate, Society of Actuaries
FSA	= Fellow, Society of Actuaries
CERA	= Chartered Enterprise Risk Analyst
MAAA	= Member, American Academy of Actuaries

## Code of Professional Conduct

- Actuaries are required to comply with the Code
  - Professional Integrity
  - Qualification Standards
  - Actuarial Standards of Practice (ASOPs)
- Actuaries who breach code are subject to discipline

## Independent Entities Involved in Professional Standards

- Actuarial Standards Board (ASB)
  - Promulgates standards of practice (ASOPs) for the US profession
- Actuarial Board for Counseling and Discipline (ABCD)
  - Serves the five US-based actuarial organizations
  - Provides guidance to actuaries
  - Responds to possible violations of the Code of Professional Conduct

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## Definition of Principle-based Reserve

1. Captures the material risks, benefits, and guarantees associated with the contracts.
2. Utilizes risk analysis and risk management techniques to quantify the risks; this may include stochastic models
3. Allows the use of company experience to establish assumptions for risks over which the company has some degree of control or influence

## 1980's: The Train Begins to Leave the Tracks

- “Your Whole Life Was a Mistake”
  
- The Rise of the All Terrain Vehicle
  - Universal Life
  - Annuities

## Evolution of Principle-based Approaches

- Asset Adequacy Testing
- Equity Indexed Annuity Regulation
- RBC C-3 Phase I
- RBC C-3 Phase II
- Actuarial Guideline VACARVM
- Proposed Valuation Manual
- Proposed RBC C-3 Phase III

## Basic Framework for PBR Calculation

The reserve is the greater of:

- A **deterministic calculation** assuming a single economic scenario
- A **stochastically derived amount** using multiple economic scenarios

## Deterministic Amount

- Serves as a floor for the stochastic amount
- Is not designed to capture all risks
- Exact form of the calculation will differ by product. For example, for life product reserves, the deterministic amount is defined using a gross premium valuation method

## Stochastic Amount

- Closer to a “true” principle-based reserve, since it more adequately captures all risks
- Multiple economic scenarios are used to capture “tail risk” (risks that have high impact, but low probability)
- The amounts calculated for each economic scenario are ranked from highest to lowest, and the reserve is determined by taking the average of the highest amounts above a prescribed level, such as 70% (i.e., the average of the highest 30%)

## PBR Requires a Sophisticated Cash Flow Model

- Cash flow model is needed to project all cash flows arising from the contracts and related assets
- Expect most companies to use their cash flow testing model
- Cash flow model is used to determine:
  - Liability cash flows (death benefits, surrender benefits, expenses, etc.)
  - Asset cash flows (investment income, asset maturities, asset defaults, etc.)

## Valuation Assumptions

Under PBR, valuation assumptions will fall into one of three categories:

- Prescribed Assumptions
- Stochastically Modeled Assumptions
- Prudent Estimate Assumptions

## Prescribed Assumptions

- **Prescribed assumptions** are deterministic assumptions used for risks where the company has very little or no influence or control over the outcome
- For these types of risks, all companies will be required to use the same assumptions
- Expect their use to be limited

## Stochastically Modeled Assumptions

- **Stochastically modeled assumptions** are used for risks that can be properly modeled through a stochastic process
- Currently, only interest rate movements and equity returns are required to be modeled stochastically
- Is a subset of prescribed assumptions, since the company must:
  - Use prescribed pre-packaged scenarios, or
  - Satisfy prescribed calibration criteria if the company its own scenario generator

## Prudent Estimate Assumptions

- **Prudent estimate assumptions** are used where the company has some degree of influence on the outcome of the risk factor
- Equals the actuary's best estimate of the future, (i.e., "anticipated experience") plus a margin that includes a provision for adverse deviation and estimation error
- Must be reviewed periodically and updated as appropriate

## Assumption Margins

- Reflects the degree of uncertainty in the anticipated experience assumption
- Provides an element of conservatism
- Regulators are concerned about:
  - the degree of discretion given the actuary to establish margins
  - Whether margins are determined separately for each risk factor, or determined in the aggregate
  - What to do if there is a lack of credible experience data

## Major Challenges

- Additional resources (staff and tools) for both companies and regulators
- Balancing the desire for simplicity with the need to properly capture the underlying risks
- Auditability of reserve calculations for regulators
- Determining appropriate assumption margins
- Impact on taxes (tax deductibility & 7702 issues)

## Experience Reporting

- Under PBR, companies will be required to submit their own company experience (mortality, lapse, expenses, etc.)
- Current framework relies on companies to voluntarily submit data
- May have exemptions for small companies

## Uses of Data

- Regulators: To review the reasonability of company-specific assumptions
- Companies: To assist in developing valuation assumptions when the company has little or no credible and/or reliable experience data.

## Roles

- Statistical agent
- SOA
- NAIC
- State Regulators

## Role of Statistical Agent

- Database expertise
- Interacts with Company
- Scrubs Data
  - Ensures entity that compiles data receives high quality / useable data
- This compiler could be:
  - One of the Statistical Agents
  - Maybe the NAIC

## Role of SOA

- Actuarial Expertise
- Performs industry studies
- Industry studies are important for setting PBR assumptions

## Proposed Role of NAIC / State Regulators

- Need to set up experience reporting structure
- Set up process for selecting statistical agents
- Determine data format (i.e., statistical plan)
- Oversee statistical agents
- Determine additional PBR-related needs

## Uniformity

- Plan is to have all 50 states require submission in the same format
- Discussions continuing with all parties to ensure uniformity in data reporting

## Confidentiality

- Access Rights being discussed
- Only regulators and their designated agents will have access to individual policy records
- Only regulators and their designated agents will have access to company-level data
- Public will have access to aggregate industry report

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## Similarity of U.S. PBR and International Solvency Frameworks

- Report true risk
- Blend of company and market experience
- Auditable and verifiable
- Uniformity
- Establishment of control levels
- Practical Options
- Objective to disclose margins in assumptions

## Common Elements of U.S. PBR/PBA & Solvency II Frameworks

- Reserves are sum of a central estimate and a margin
- Capital is for extreme events
- Capital requirement meant to reflect actual risk position and the management of the company

## Differences between U.S. PBR/PBA & Solvency II Frameworks

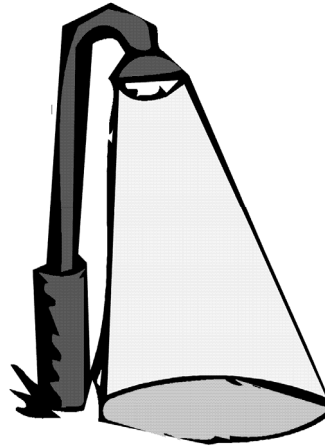
- Scope
  - U.S. framework is more product & risk specific
  - Life PBR will apply only to new business
- Measurement
  - Solvency II – favors using one-year horizon, “market-consistent” approach
  - U.S. PBA – CTE and Greatest Present Value of Accumulated Deficiency over the life of the business

## Raising the “Bar”

- Moving forward with U.S. PBA will help actuaries further develop their “skills”
  - For example, modeling, developing assumptions, reporting, and reviewing results
  - Better understanding of process and product risks
- These “skills” can be used in different accounting and solvency regimes
  - “current” – U.S. PBA, circa 2012
  - “new” – such as PBA/Solvency II hybrid, circa 2016

## Aim of U.S. PBA since late 1990's

- Encourage the financial reporting process to shine its light into the future
- Allow for proper recognition of risk when determining risk-based capital and reserves



## Bottom Line Irony

- While Risk-Focused Exams are effective January 1, 2010 in U.S. there is no requirement for life risk focused financial reporting !!

## Implications

1. PBA – Is the advantage to companies only due to diversification? (Bigger is Better?)  
Or does it create a learning-based reporting and management culture?
2. Can Enterprise Risk Management (ERM) be used to manage the regulatory process as well?

## Conceptual Approach – Actuarial Control Cycle

- Specify the Problem
- Develop a Solution
- Review & Monitor

## Political Theory 101

- Where does Power Reside?
  - Kings vs. “The People”
- History Seems to Support the Following
  - Power needs to be exercised with checks and balances which includes transparency and accountability
    - Accountability includes an “accounting” of what was learned from the reporting (and review) process

## The Grammar of ERM (or The Science of Risk Management)

- Can ERM affect “how” the regulator goes about its functions?
- Outline of general approach
- Comparison to banking exam process

## Can ERM Impact "How" the Regulator Does Its Job?

- Companies see value to shareholders of transforming their corporate culture, measuring and decision-making through use of an ERM discipline
- Would regulators benefit from this? Implications would be:
  1. A healthy *check and balance process* to address divergent views (Just as the corporate ERM structure does, as well)
    - a. *Shifts focus from having a right or wrong "number"* to understanding and documenting the methods and assumptions behind the number as well as clarifying the change process for those assumptions and methods
  2. Recognize and build on company ERM goal that to minimize *profit volatility is a stricter standard than regulator concern over solvency*
  3. Issuing a policy is to take on risk. *Managed risk needs to be measured. Not measuring is gambling*

## Can ERM Impact "How" the Regulator Does Its Job? (Part 2)

- Constructing/Expanding ERM Internal *Feedback Loop* concepts to include both *regulator, industry and professional* views
- ERM as a discipline should mean each state in U.S. does not need a rocket scientist out "catching" all the mistakes of the industry's rocket scientists. Instead the methodology means basic skill set is good analytic, coordination and communication skills with *access on a limited basis to rocket scientist level of expertise*
- A discipline means an *organized, "grammatical" approach to managing and overseeing risk*
- Internal Models are not Econometric (based on tracking relationships and thus always wrong), but are scientific-based baselines to verify actual to expected (increasing competence via an organized learning process based on clear accountability)

## An ERM Approach to the Regulatory Review Process

- What are the risk exposures?
  - Includes both financial and operational
  - Regulator and Company assess and concur on initial, FINITE list
- What are the company's plans to manage and/or hedge the risks?
  - How does management of non-guaranteed values/options affect this?
- What are the net risk exposures of the company?
- What are the first/second/third moments of the risk exposure and is the reporting frequent enough to manage the deltas?
  - Includes assessment of validity of risk measures

## Define Accountability

### Company:

- Identify/understand its risks
- Measure in order to manage
  - Risk oversight phrase is "*Follow the risk*" - measure it, however crudely, with feedback so the measurement/model gets better each time. The measurement gives a current balance sheet number.
  - But more importantly, a view of where the future could go (through sensitivity testing of key risk exposures)
- Manage
  - Expenses, dividends, excess interest credits, sales level, underwriting & feedback loop process, repricing

### Regulator Underwrites:

- Competence of Company via its own self reporting
- Integrity via how often company holds to its risk limits

## Essential Starting Points

- Company ERM goal to minimize profit volatility is far stricter standard than regulator concern over solvency
- Regulator does not approve a product but a risk management program
- Internal Models are not Econometric (based on tracking relationships and thus always wrong), but are scientific based baselines to verify actual to expected (increasing competence via an organized learning process based on accountability)

## Purpose of Internal Models & When to Use

- Neither regulators nor industry need complex models for everything
- Models cannot assess cost of risks not modeled, e.g., LTCM & subprime
- But, initial testing is needed to determine sensitivities, need for models and interim reporting needs
  - For example, health insurance may focus on loss ratios and company expense levels as critical interim reporting

## Financial Risk Issues

- As an example, a particular product may have:
  - Interest Rate Exposure ( $\rho$ )
  - Equity Exposure (delta & gamma)
  - Volatility Exposure (vega)
  - Policyholder Behavior Risk
  - Underwriting Risk
- Can measures of exposure/financial risk be independently verified or calculated in alternative ways?
- What are their sensitivities?

## Initial and Subsequent Regulatory Review

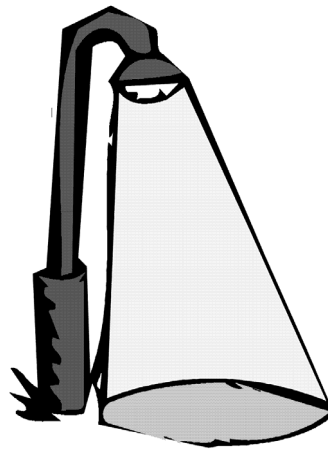
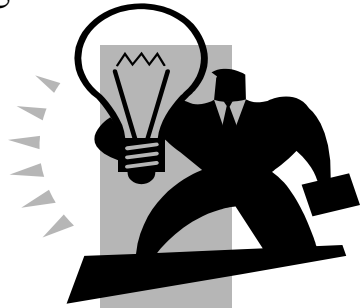
- Needs to identify
  - When company is hedging
  - When it is “gambling” within specified risk tolerances that only affect the level of profits
  - Sensitivity testing that defines how rapidly reserve & capital changes could occur that would impact solvency
  - Frequency information is summarized and/or shared with regulators

## Format for Recap of Risk Reports

- Name of report
- Who prepares it & how often
- Who receives it
- Exception reporting process
- List of actions taken based on exception reports

## 7. CASE STUDY

- Encourage the financial reporting process to shine its light into the future



## From Speech by Australian Provincial Regulatory Authority (APRA)

(Speech Oct. 8, 2003 )

- Looking ahead, the main potential source of risk to financial stability would be a substantial correction in the housing market, impacting on the balance sheets of authorized deposit-taking institutions through mortgage defaults. The concern would be a sharp jump in mortgage defaults ...
- Since reporting process had “the right lights on” APRA requested companies to run a stress test (30% one year reduction in housing prices + increase in defaults)
- [http://www.apra.gov.au/Speeches/03\\_20.cfm](http://www.apra.gov.au/Speeches/03_20.cfm)

## RESULTS

1. Tests identified weaknesses
2. Corrections were made to capital and concentration risks
3. PMI Australia’s rating is higher than its parent rating
4. International recognition as strong & robust for banks and mortgage insurer market.
5. SO YES, SOMETIMES YOU CAN KNOW WHAT YOU DON’T KNOW AHEAD OF TIME

Q & A?

Q&A?

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## Principles-Based Valuation Project

- Next Steps
  - NAIC adoption of amended Standard Valuation Law December 2008?
  - Begin Legislative adoption of amended Standard Valuation Law in next 2 years beginning in 2010.
  - Operative date of VM provides trigger
- Recent Economic Changes
  - Remember, the benefits are the greatest to the regulatory community