



cutting through complexity

PBR in the Audit: What to Expect

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Agenda

- **Background of PBR**
- **Audit Risks**
- **Assumptions and Experience Studies**
- **Governance**
- **Audit Work Plan**
- **Q&A**

PBR is more certain than ever



What needs to happen for PBR to be effective?

- At least 42 states must adopt regulation
- Adopting states must cover at least 75% of written premium
- 3-year transition period is expected to be permitted

There is a high likelihood that “supermajority” requirements will be met and PBR will be effective 1/1/17 for new business.

Current Status:

- NAIC (as of 11/2): 38 states have adopted PBR and 5 states (AL, MA, SC, WA, and WI) are considering PBR
- With California’s adoption, the 75% premium requirement has been met
- NY remains publicly opposed to PBR

Valuation manual sections under PBR

VM-00	Introduction
VM-01	Definitions for Terms in Requirements
VM-02	Minimum Nonforfeiture Mortality and Interest
VM-05	NAIC Model Standard Valuation Law
VM-20	Requirements for Principle-Based Reserves for Life Products
VM-21	Requirements for Principle-Based Reserves for Variable Annuities (AG 43)
VM-22	Requirements for Principle-Based Reserves for Non-Variable Annuities (Under Development)
VM-25	Health Insurance Minimum Reserve Requirements
VM-26	Credit Life and Disability Reserve Requirements
VM-30	Actuarial Opinion and Memorandum Requirements
VM-31	PBR Report Requirements for Business Subject to a Principle-Based Reserve Valuation
VM-50	Experience Reporting Requirements
VM-51	Experience Reporting Formats
VM-A	APPM Sections (model regulations)
VM-C	Actuarial Guidelines
VM-G	Corporate Governance Requirements for Principle-Based Reserves
VM-M	Mortality Tables



What products and companies are in scope?

- All life products except pre-need, credit life, industrial, and riders and supplemental benefits with stand-alone charges
- Small company exemptions are expected to cover about 362 companies representing \$9B of premium (based on 2013 data)
- Other companies may be exempt due to writing business in a single state

Three exemption tests:

- Premium written
- RBC ratio
- Other risk criteria

If a company is exempt, current CRVM calculations should be applied.

What is the PBR calculation?



3 components to evaluate

- Net premium reserve (NPR) – reserve floor
- Deterministic reserve (DR)
- Stochastic reserve (SR)

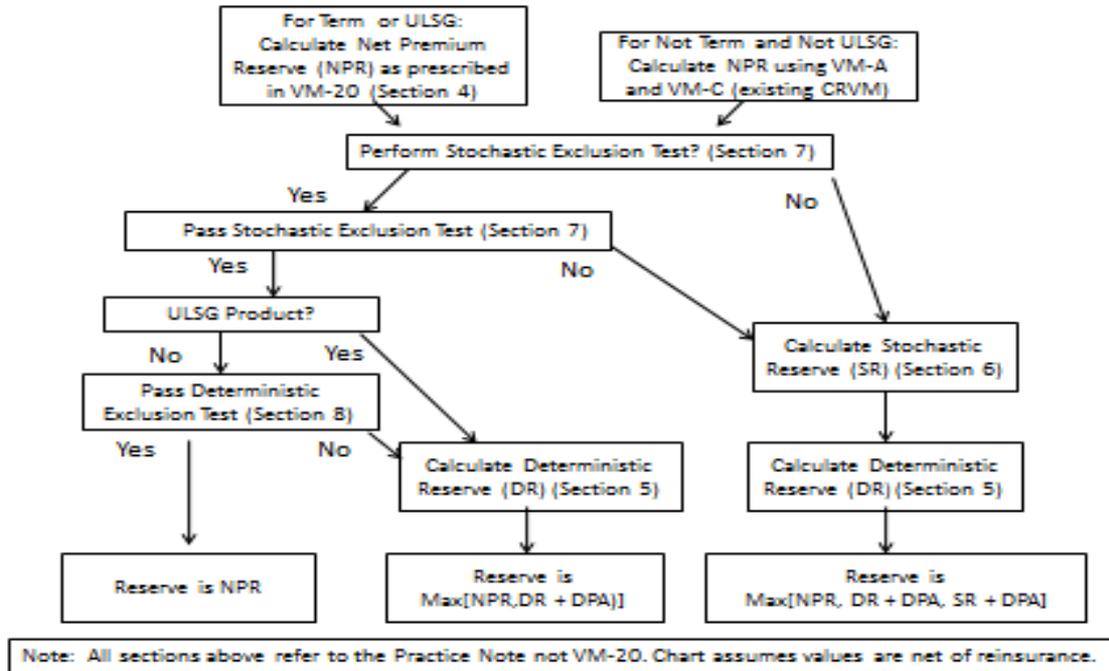
The booked reserve will be the maximum of these components

Exclusion tests

- SR – products may be exempt from the SR calculation if there is little interest or equity risk
- DR – non-ULSG products may be exempt from the DR calculation if future net premiums are less than future gross premiums



PBR Calculation Schematic



NPR, Deterministic, and Stochastic reserve



Net Premium Reserve – seriatim

- Mortality
- Interest
- Lapse
- Cash Value Floor

Deterministic Reserve – can be grouped

- PV (benefits, expenses, and related amounts), Minus
- PV (premiums and related amounts)

Stochastic Reserve – can be grouped

- Project cash flows using 1,000 stochastically generated scenarios and calculate GPVAD for each scenario
- Calculate CTE 70
- Determine any additional amount needed to capture any material risk not reflected in the cash flow model
- Reserve = CTE 70 + additional amount

Stochastic and deterministic exclusion test

Stochastic

Stochastic Exclusion Ratio Test

The ratio of $(b-a)/c$ shall be less than 4.5% where

- a = the adjusted deterministic reserve using baseline economic scenario
- b = the largest adjusted deterministic reserve under any of the other 15 economic scenarios
- c = an amount calculated from baseline economic scenario that represents PV of benefits for the policies, adjusted for reinsurance.

Stochastic Exclusion Demonstration Test

To exclude a group of policies from the stochastic reserve requirements: Demonstrate that the stochastic reserve on standalone basis would not increase the minimum reserve

In the first year and at least once every three calendar years thereafter the company provides a demonstration in the PBR Actuarial report for compliance

Deterministic

- ULSG or a group of policies not excluded from the stochastic reserve requirement is deemed to not pass the deterministic reserve exclusion test
- To pass the test, company must demonstrate sum of the valuation net premiums for all future years for the group of policies is less than the sum of the corresponding guaranteed premiums for such policies
- If no new business and passed the last three years, then deemed passed until determined otherwise. If new business, then must test at least once every five years



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Differences from current stat



Current statutory reporting is highly prescriptive. PBR emphasizes process over prescription.

- Identifying risks
- Producing economic assumptions
- Setting assumptions
- Determining margins for assumptions
- Modeling and measuring risks
- Sensitivity testing
- Documentation

Model components



Three components to any model

Inputs

- Assumptions/margins
- Policyholder data
- Product features/guarantees
- Economic scenarios
- Model point grouping
- Hedging and reinsurance

Model Calculations

- NPR, DR, and SR
- Exclusion tests
- Manual calculations outside the valuation model
- Implementation of hedging and reinsurance
- Generation of economic scenarios

Outputs

- Outputs to analyses
- Manual adjustments
- Reserve determination – NPR vs. DR vs. SR
- Upload to general ledger

Model risks – overall

Risks

- Not in compliance with PBR
- Inaccuracies or errors
- Lack of completeness
- Subjectivity (stochastic assumptions/methodology)
- Improperly or insufficiently documented
- Lack of internal change controls
- Available resources are not appropriately skilled or knowledgeable



Assumptions

- Incorrect coding of assumptions
- Coded assumptions are inconsistent with recent or anticipated experience
- Assumptions not in compliance with PBR; not adequately justified or documented
- Scenarios not in compliance with VM-20 recommendations; not adequately justified
- Improper coding or mapping of funds in the system
- Poor choice of economic scenarios

Data

- Policyholder data is inaccurate, incomplete, or improperly coded

Audit risks: Inputs (cont'd)



Hedging

- Hedging not implemented properly
- Documentation does not meet the guideline requirements

Product Coding

- Product features and guarantees not properly coded in the system
- Product parameters do not properly reflect the provisions of the underlying benefit forms
- Improper conclusions drawn from analyses due to poorly defined product coding

Audit risks: Model calculations



Home-Grown Model

- Lack of documentation (e.g., audit and key person risks)
- Lack of internal controls or change controls

External Vendor Model

- Can't handle complex or unique product features
- “Black box” logic (e.g., audit and transparency of understanding)
- Undiscovered errors

Audit risks: Model calculations (cont'd)



Whether home-grown or vendor supplied:

- Calculation engine programming errors
 - Formula errors
 - Mapping errors (e.g., pointing to incorrect tables)
- Routines in the calculation engine are using logic that deviates from intended or documented
- Selected economic scenarios fail to appropriately capture tail risk or otherwise do not comply with PBR
- Improper reflection of hedging or reinsurance
- Significant non-modeled business that is not handled by calculation engine and inadequately handled manually
- Output reports are not complete, summarized incorrectly, or otherwise misleading
- Lack of controls over manual processes

Audit risks: Outputs



- Risk that calculation engine output reports are not complete or are summarized incorrectly
- Adjustments for non-modeled business are not appropriately reflected
- Manual errors when reformatting outputs for reporting or analysis purposes
- Incorrect values uploaded to general ledger



Controls relative to the model risk inherent in the PBR process

- Controls over choice of key non-economic assumptions, such as policyholder behavior and mortality assumptions
- Controls over choice of key economic assumptions
- Controls over model implementation and change control procedures
- Controls over end-to-end process

Sufficiency of controls and related documentation relative to:

- Current SOX requirements (to the extent applicable for statutory)
- NAIC Model Audit Regulation (MAR)



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Experience studies



Frequency

- Emerging experience should be reviewed annually
- Assumptions should be periodically reviewed and updated

Data

- Company specific data can be used if relevant and credible
- Assumptions must be sensitivity tested to ensure assumption is conservative and plausible

Disclosures

- Experience studies must be provided to regulators so they can better assess assumptions

Assumptions for PBR



General Requirements

- NOT locked in
- Prudent best estimate
- Margins – on each assumption (as currently written) vs. aggregate (under discussion)
- Company experience can be used for any risk factor, if relevant and credible, otherwise industry experience should be used

Mortality

- Use company experience and grade to industry table

Policyholder Behavior

- Dynamic modeling with margins
- Additional sensitivity testing should be performed



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Governance for PBR



A principles-based methodology requires a robust governance framework.

- Flexibility in assumptions, methods, and models requires a higher standard of governance
- Companies are obligated to assure they are governing the process by which reserves are determined
- Regulators must obtain assurance that results are appropriate and consistent with the legal requirements

VM-G provides guidance regarding responsibilities for company boards, management, and qualified actuaries under PBR.

The SVL primarily points to the VM for governance, but does specifically:

- Require that PBR assumptions, methods, and models be consistent with (but not necessarily identical to) those used in other company risk assessment processes
- Require that the company annually provide to the commissioner and the board a certification of the effectiveness of internal controls with respect to the PBR valuations

Governance – Roles and responsibilities



Board

- Primary role is oversight
- Reviews summary results and other information on the PBR process
- Determines if additional steps are needed to rely on the PBR process of the company
- The oversight function should be commensurate with the materiality of principle-based reserves in relation to overall risks of the company

Senior Management

- Provide information to the board
- Review PBR results
- Adopt internal controls over PBR valuations
- Ensure resources are adequate and competent
- Ensure PBR processes operate as intended

Qualified Actuary

- Oversees the calculation of principle based reserves
- Review and approve the assumptions, methods, models, and internal standards
- Provide a summary report to management and the board
- The Appointed Actuary provides an annual report on the adequacy of all reserves
- Responsible for working with auditors (internal and external) and regulators

Governance considerations



Topic	Typical Findings
People	<ul style="list-style-type: none">■ Key model stakeholders don't understand or agree to the risk assessment process■ Company culture does not actively support the a robust model governance■ Roles and responsibilities not clearly defined
Documentation	<ul style="list-style-type: none">■ Model documentation is not detailed or robust enough to be appropriately understood and implemented■ Documentation does not adequately cover model inventory, validation, model issues, and resolutions
Change Management	<ul style="list-style-type: none">■ Effective model change procedures not in place■ Policies for acceptable practices for model development, implementation, and use not in place■ Controls do not exist to identify changes to product features
Assumptions	<ul style="list-style-type: none">■ Approved assumptions are not utilized consistently across model groups (input/ output)■ Accuracy of data used in experience studies is not adequately controlled■ Lack of robust documentation for actuarial and economic assumptions and scenarios
Data	<ul style="list-style-type: none">■ Data used throughout the process is not certified as accurate, complete, and appropriate by model or data owners■ Data integrity is not appropriately managed within the model processes■ Data quality is not defined and measured on a consistent basis

Governance considerations (cont'd)

Topic	Typical Findings
Internal Models	<ul style="list-style-type: none">■ Lack of control over spreadsheet models■ Key person risk with relation to spreadsheet models
Vendor Models	<ul style="list-style-type: none">■ Vendor models are not effectively tested for appropriateness■ Lack of understanding of functionality of vendor models (“black box” phenomenon)
Inventory	<ul style="list-style-type: none">■ The model inventory does not contain all relevant information to adequately manage and prioritize new risks■ The model inventory is incomplete or inaccurate and does not include all models that are implemented, under development, or recently retired
Reporting	<ul style="list-style-type: none">■ Model validation governance processes do not include appropriate and adequate requirements for internal and external reporting, specifications for validators and guidance to analyze the impact of findings.■ Lack of formalized reporting that indicates compliance with governance requirements
Validation	<ul style="list-style-type: none">■ Model testing does not include a component of rigor and robustness based upon risk■ Lack of support from senior management for model validation■ Lack of a formalized policy for prioritization, scope, and frequency of validation activities

Governance and controls – Scorecard



December 2012 SOA Research Study on Actuarial Modeling Controls

Topic	#	Leading Practice	Rating (1-5)
Governance Standards	1	We have established a formal, documented governance policy for actuarial modeling processes that is actively and periodically reviewed.	
	2	We regularly review models and the modeling process against the governance policy for compliance purposes.	
	3	We have developed a corporate culture which values and aligns with the governance policy.	
The Modeling Process	4	We have consolidated models to a single platform or a single modeling system where feasible. Where this is not feasible, we have implemented additional controls to ensure model integrity across all modeling platforms.	
	5	We have established a model steward with clearly defined responsibilities for ensuring adherence to the model governance standards.	
System Access and Change Control	6	We have implemented a formal change management process for governing model code changes and model updates.	
	7	We periodically have internal model releases to ensure consistency of the model of record across the organization.	

Governance and controls – Scorecard (cont'd)



December 2012 SOA Research Study on Actuarial Modeling Controls

Topic	#	Leading Practice	Rating (1-5)
Model Assumption Mgmt	8	We have automated the input of assumptions into the models.	
	9	We have implemented a formal sign-off process for the setting of model assumptions.	
	10	We analyze and document the impact of each significant assumption change as part of the formal assumption approval process.	
Model Input Mgmt	11	We obtain model input data feeds automatically from a centralized data warehouse.	
	12	We have automated and standardized a set of test analytics performed to test validity of model input.	
Model Output Mgmt	13	We have automated and standardized model output used for reporting and analysis, to ensure a consistent presentation of information.	
	14	We store model output in a data warehouse which can be queried to allow for additional analysis and evaluation of model results to prevent loss of data.	



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Changes to reserves



A principles-based methodology will lead to less intuitive results.

- Potential for increased volatility under PBR and reserves will not follow a simple trend like current statutory
- Auditing reserves will require increased focus on assumptions and methodology
- Regulators will also have a shift in focus.

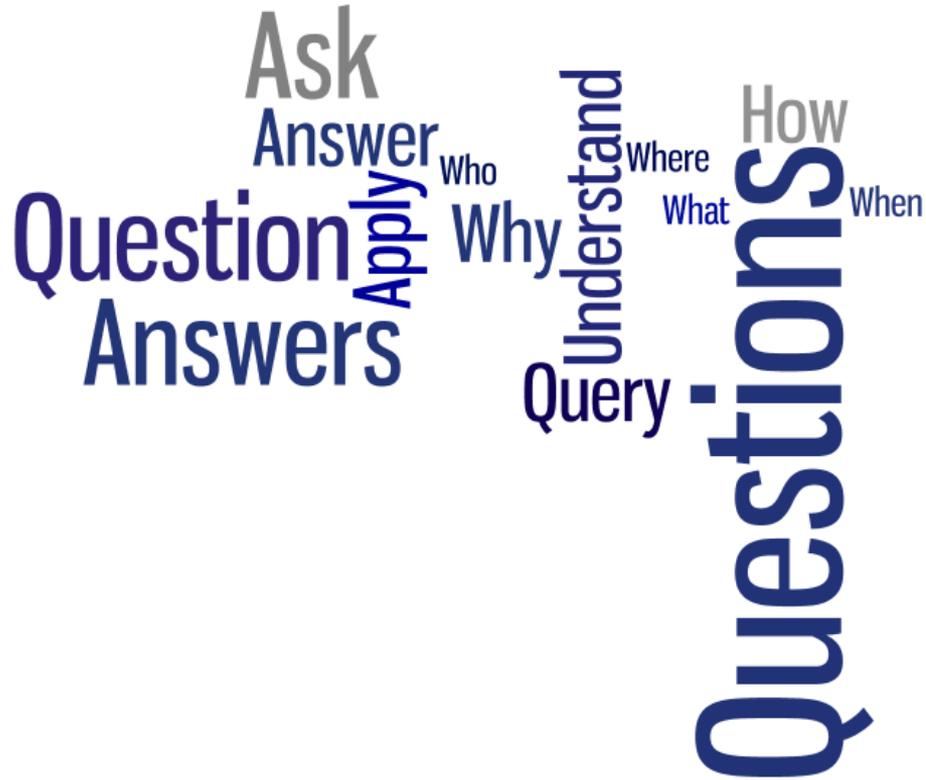
PBR is not a completely new concept

- Canada has been using a principles based approach (CALM) for many years
- Certain existing US reporting regimes are similar to PBR
 - AG 43 for Variable Annuities is PBR
 - FAS 97 Unlocking
 - Asset Adequacy Analysis

Workplan: Key steps

1. Selection of Model Points for Testing
2. Review of Inputs
3. Review of Model Calculations – Stochastic vs Deterministic
4. Selection of Economic Scenarios
5. Review of Hedging
6. Review of Reinsurance
7. Review of Outputs, Analysis, and Documentation

Questions?





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