2014 EAAC TAIPEI TAIWAN

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Challenges and Opportunities

ERM Practice of Life Insurers in China

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Outline

- Evolving demands of ERM in China
- Key Challenges of ERM in China
- ERM practice in CIGNA&CMB
  - ERM Organization
  - ERM Process
    - Risk budgeting
    - Risk profiling
    - Risk monitoring
  - ERM New Developments
  - ALM Modeling

Evolving demands of ERM in China

- Main driving force

Inside pull

- Recent corporate failures
  - Liquidity strain
  - Insufficient capital
- Increasing competition
  - Liberalization of pricing interest rate
  - Thinner margin and more difficult distribution
- Increasing exposure to market volatility
  - Liberalization of investment channels
- More complex business models

Outside push

- Global initiatives on risk management
- **Regulation development**
- Rating agencies incorporating ERM in assessments
- Increasing demand from stakeholders in understanding risks

Evolving demands of ERM in China

- Regulation development

Solvency Aligned Risk Management Requirement and Assessment (SARMRA) - Draft

2014

Guidelines on Implementation of Enterprise Risk Management for Life, Health and Pensions Insurers

2010

- ❑ Firstly explain the concept of ERM
- ❑ More comprehensive and detailed than the rules in 2007
- ❑ Set target deadline for compliance of several items in the guidelines, e.g. risk management information system
- ❑ A comprehensive enterprise risk management report approved by Board should be submitted to regulator by April 30th annually

Directive for Risk Management of Insurance Companies

2007

- ❑ Only very high level guidelines
- ❑ No target date for compliance
- ❑ Insurers start to submit annual risk assessment report to regulator

China Risk Oriented Solvency System

Evolving demands of ERM in China

- Highlights of SARMRA (Draft)
  - Regulator will make assessment on insurer's risk management performance on annual basis
    - Risk management organization and rules
    - Risk appetite framework and risk management approaches
    - Risk management performance on insurance risk, market risk, credit risk, operational risk, strategy risk, reputation risk and liquidity risk
    - Risk management performance on information disclosure
  - For each area, regulator will mark from the perspective of soundness, effectiveness and results, and then aggregate
  - ***Final score (S) determines the risk factor (Q) used to calculate Minimum Capital required for Control Risk (MC_{CR}), part of the total Minimum Capital for insurers***

$$Q = - 0.005 * S + 0.4$$

$$MC_{CR} = Q * MC_{QR}$$

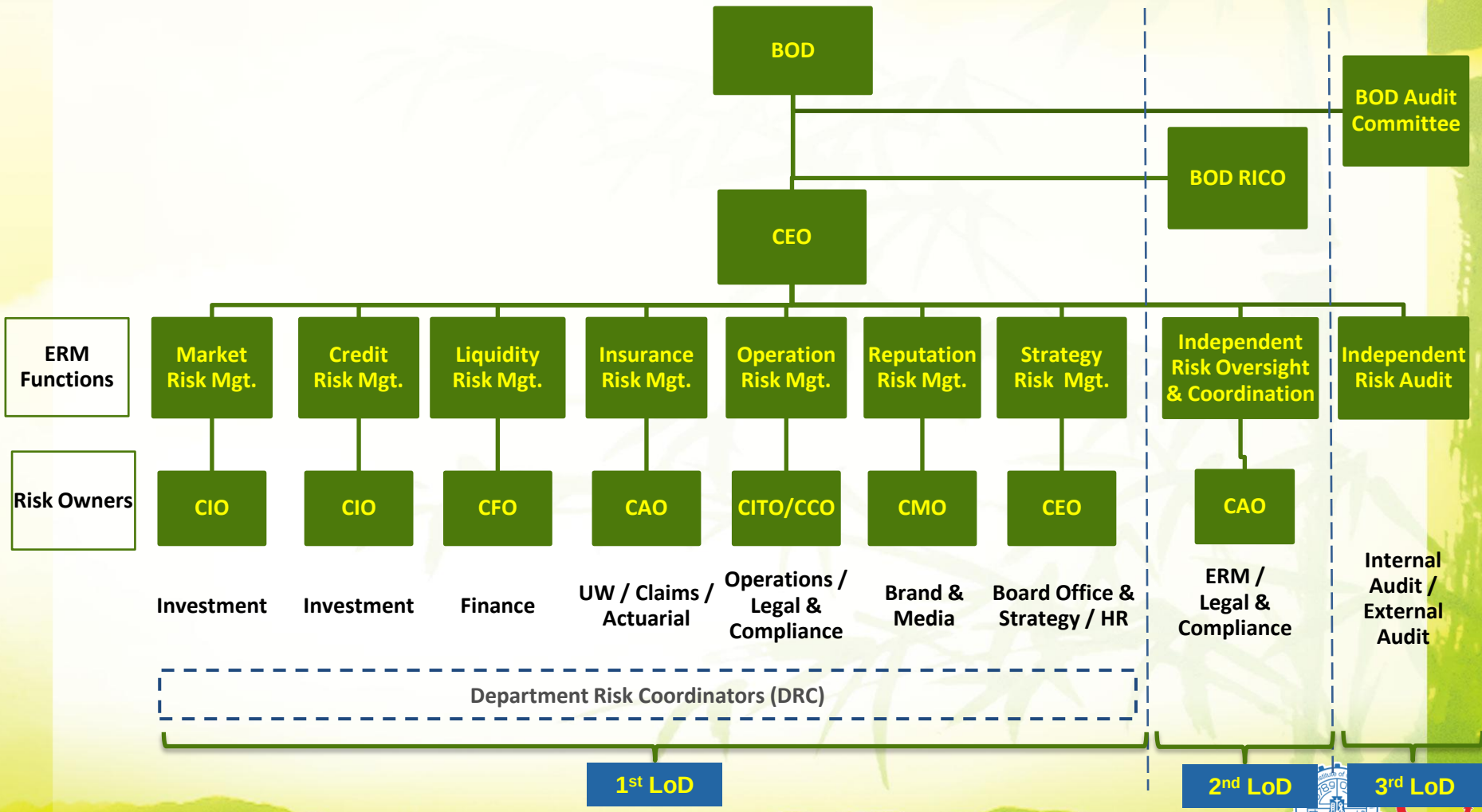
$$MC = MC_{QR} + MC_{CR}$$

Key Challenges of ERM in China

- Buy-in of senior management (sales vs. risks)
- Linkage between models and decision-making (science vs. art)
- Harsh market environment (scale vs. quality)
- Short of experience & expertise
- Ever-changing regulation requirements of ERM

ERM Practice in CIGNA&CMB

- ERM Organization Structure



ERM Practice in CIGNA&CMB

- ERM Department
  - ALM Team + RM Team
  - ALM Team covers financial risks
    - Market risk, Credit risk, and Liquidity risk
  - RM Team covers other risks
    - Insurance risk, Operation risk, Strategy risk, and Reputation risk
  - **Coordination** of risk identification, evaluation, mitigation, and monitoring
  - Close relationship w/ 1st LoD, Partnership w/ Legal&Compliance, Collaboration w/ 3rd LoD

ERM Practice in CIGNA&CMB

- ERM Processes
  - Risk Budgeting (risk appetite & limit)

  - Risk Profiling (risk identification, analysis, mitigation)

  - Risk Monitoring

Risk Budgeting

Recommendation

Embedded Value at Risk (EVaR) to be used as the metric for risk budget.

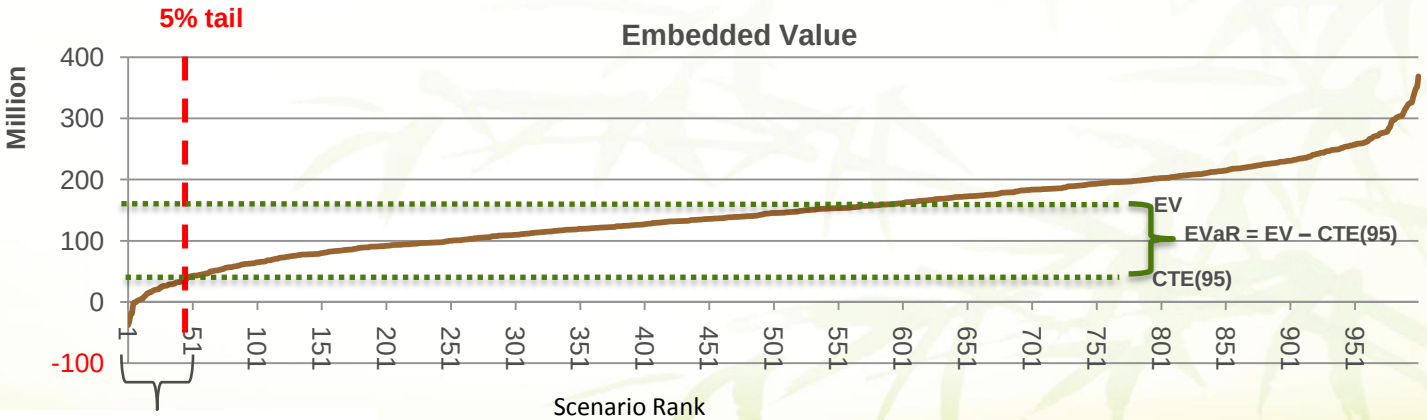
Supplementary metrics (EVaR/EV, CaR, LaR, etc.) will complement the risk management process and understanding of the risk.

What is Embedded Value at Risk?

- **Embedded Value at Risk** (EVaR) measures how much value of the business (EV, traditional one) could potentially be destroyed if particular "pessimistic scenarios" were to happen in future.
- The time horizon of EVaR measure is based on the future lifetime of all the policies (in-force and projected new business), a long term view rather than a 1-yr short term view of other metrics (e.g. VaR, RAROC, etc.)
- Based on realistic economic assumptions of the future, but since the future is unknown, stochastic scenarios simulation approach is used.

Risk Budgeting

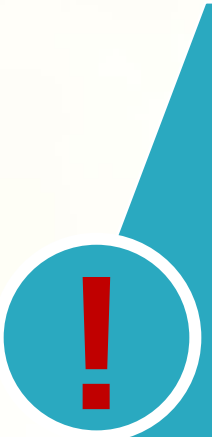
- An ALM model developed to project future financial statements
- Stochastic simulations of 1000 real world economic scenarios
- EV calculated under each scenario, and ranked from worst to best
- Average embedded value calculated based on the 1000 scenarios → EV
- Average embedded value of the worst 5% scenarios calculated → CTE(95)
- EVaR = EV less CTE(95)



CTE(95) = Average of worst 5% of scenarios

Risk Budgeting

- Limitations of EVaR



- Highly dependent on underlying assumptions in the projection model (notably interest rates and policyholder behavior)
- CTE(95) does not represent the true "worst case scenario"
- Represent an economic view, not an accounting view (i.e. cannot connect directly to US GAAP or local GAAP financials)

Despite these limitations, EVaR is still a better option than other existing metrics. Supplementary metrics will complement EVaR for risk assessment and management purposes .

Risk Budgeting

- Other Supplementary Metrics

	Metrics	Objectives	
Value	▪ Embedded Value ▪ Embedded Value at Risk ▪ EVaR/EV ratio	▪ Measure the value of the company and potential reduction in value	Primary measure
Solvency	▪ Solvency Ratio ▪ Free Surplus/Capital ▪ Capital at Risk (unexpected capital injection requirement)	▪ Measure the potential negative impact to the solvency/capital position of the company	Supplementary measures
Liquidity	▪ Liquidity at Risk (maximum liquidity requirement)	▪ Measure the availability of cash or equivalent assets needed to cover surrender & maturity (lifetime)	
Earnings *	▪ Earnings at Risk	▪ Measure the potential negative impact to the one year GAAP earnings	

A quarterly dash board of the metrics is produced and monitored.

Risk Budgeting

- Governance

Board of Directors	Management

• Aligned with annual business plan cycle, BoD will approve the business plan together with the risk budget (EVaR) for the following year.
• During the year, regular BoD meetings will review the annual EVaR risk budget utilization, and long term EVaR projection as needed.
• Request to breach the annual budgeted EVaR cap will require BoD approval.
	• Management is authorized to make own decisions subject to certain constraints, e.g.
	  • No more than **x**% of General Account portfolio invested in riskier assets.
	  • EVaR/EV ratio should be less than agreed limit **y**%
	• EVaR is reported monthly as part of the MOR process and ALCO meeting; results also submitted to the BoD meetings

The proposed governance process listed above will supplement, not replace the existing governance processes (e.g. approval of new class investment, counterparty limits, new product approvals etc).

Risk Budgeting

- 2014 Risk Budget

Proposed Risk Budget 2014

Primary Metric:

W Million USD EVaR

(W' Billion RMB)

(Through December 2014)

The recommended figure is based on:

- In-force and NB through Dec 2014, consistent with submitted 2014 plan
- Assumed x% riskier asset investment for general account par funds
- Include additional m% budget for flexibility
- Separate 2014 sales cap of N Billion RMB applies for product ABC

Key Risk Metrics, USD $M, JV 100% Basis

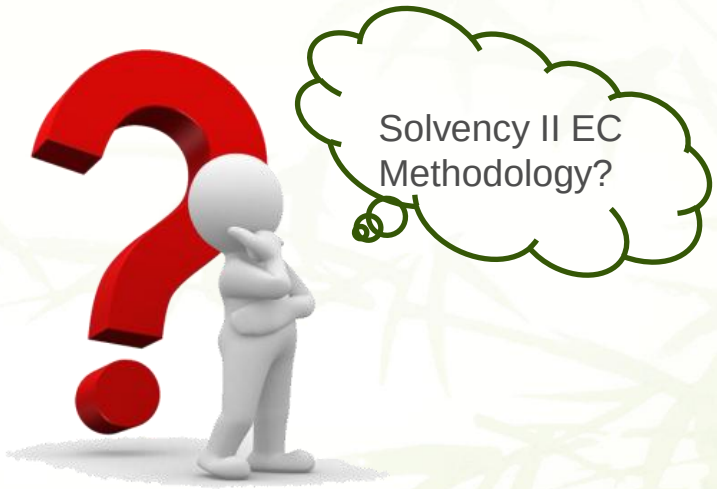
x% Equity Investment[1]	EV	EVaR (CTE95)	EVaR / EV	ST CaR[3]	LaR[4]
Baseline[2]	U	V	z%	C	L
Proposed Limit		W	Monitor (y%)	Monitor	Monitor

Supplementary Metrics

[1] In Par Funds only, serve as proxy for risker assets in the model
[2] Baseline EV and EVaR adjusted to Dec 2014 valuation date
[3] CTE95 maximum rolling 12-month capital injection
[4] CTE95 maximum cash requirement

Risk Budgeting

- New challenges posed by SARMRA (Draft)
  - Risk appetite and budget for individual risks
    - How to quantify unquantifiable risks?
    - Necessary to aggregate? How to aggregate?

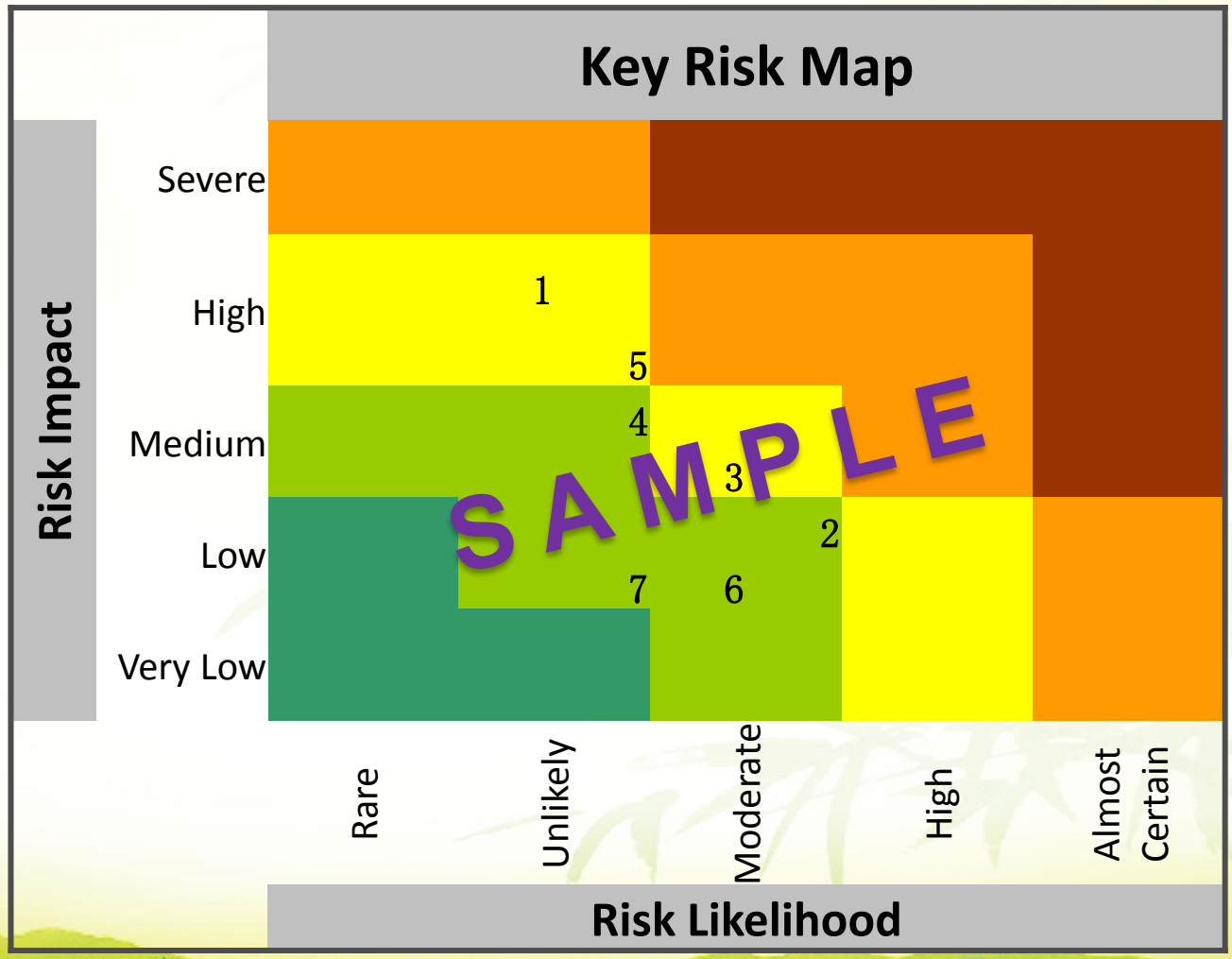


Risk Profiling

- Process
  - Implement Risk Management Information System
    - Currently in worksheet format
    - SARMRA requires seamless connection to sales, finance systems etc., and automation of data collection, analysis, report and sharing
  - Discuss with EXCOM and HODs
    - For deep understanding of the Concerned Risks and Risk Management Strategy
    - Decide risk issues and mitigation plans for risk records
  - Summary and analysis of above risk records
    - Evaluate the rating of 7 risk categories
    - Design related risk reports, charts and heat map for management review
    - Feed necessary risk information to internal audit for further auditing purpose
  - Coordinate the implementation of risk mitigation plans and follow up the status

Risk Profiling

- Heat Map



Risk Monitoring

- Risk Budget Status: ALM Dashboard

ALM MIS DashBoard

June 2013 (RMB, mn)

Company Total

Value			Earning		Solvency		Liquidity			AL Matching	
EVaR	Budget	Utilization	GAAP 1Y E	vs. Plan	12-month CaR	Free Surplus *	LaR	C&E	% of Total Assets	Investment Spread	Asset Credit Rating (Actual / Target)
EVaR/EV	Budget	Utilization	GAAP 1Y EaR	GAAP EaR/E	Solvency Ratio *	Stressed Solvency Ratio *	Illiquid Assets %	Common Stock %	Bonds %HTM	$Duration Gap **	vs. Guideline

Risk Alarm

Mitigation Action

SAMPLE

By Segments

	Value				Earning				Solvency			Liquidity			AL Matching		
	EV	EVaR	EVaR/EV	VNB vs. Plan *		GAAP 1Y E	GAAP 1Y EaR	GAAP EaR/E		12-month CaR	Worst Case 12-month Capital Call		LaR	Worst Case Liquidity Call		Investment Spread	$Duration Gap	Value Gap
RP					RP				RP			RP			RP			
SP					SP				SP			SP			SP			
NP					NP				NP			NP			NP			
ST					ST				ST			ST			ST			
CAP					CAP				CAP			CAP			CAP			

Risk Monitoring

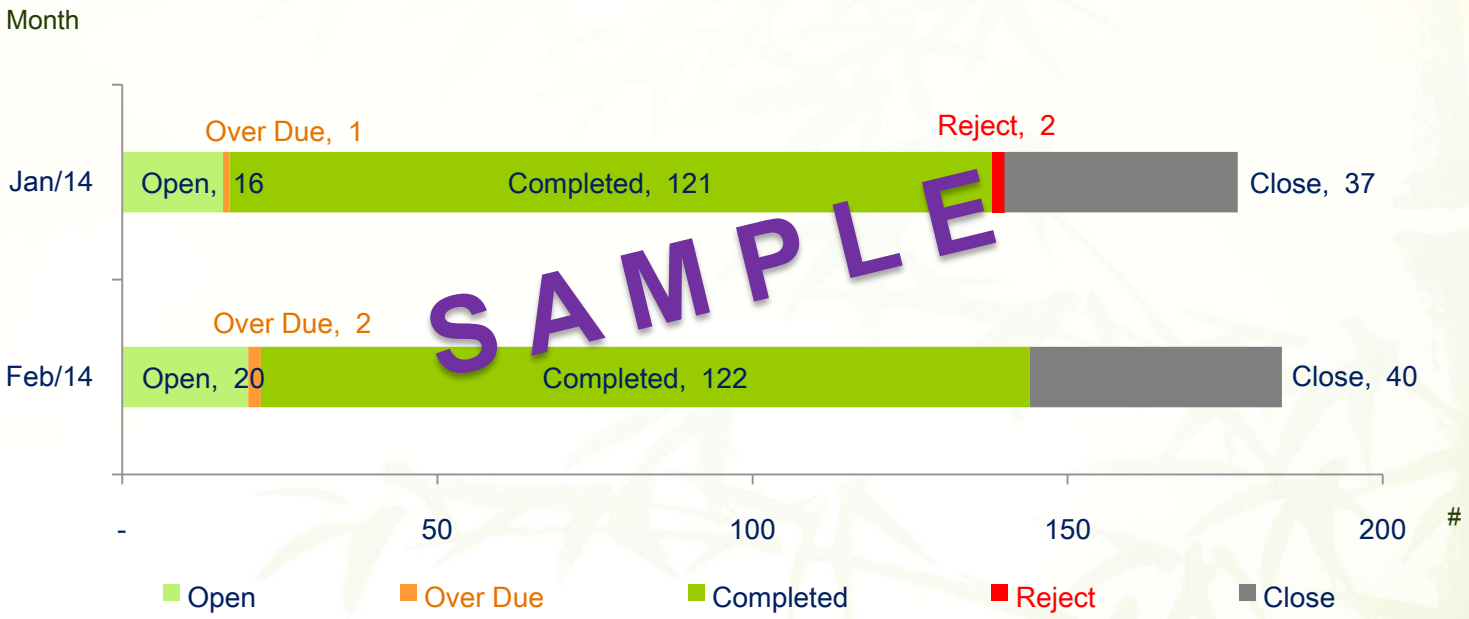
- Operation Loss Incidents
  - Loss by risk source (company, sponsors, vendors, etc.)
  - Loss by risk type (event, pattern, structure, strategic, etc.)
  - Loss by risk reason (people, process, system, external, etc.)

Risk Reason	Cases	Total Loss	=	Potential Sales Loss	+	Loss Incurred
People	3	8,000		8,000		0
People + Process	1	151,793		0		151,793
Process	2	39,250		38,850		400
System(Hardware /Software/Network)	17	409,831		405,831		4,000
Sum	23	608,874		452,681		156,193

SAMPLE

Risk Monitoring

- Audit Follow-up



ERM New Developments

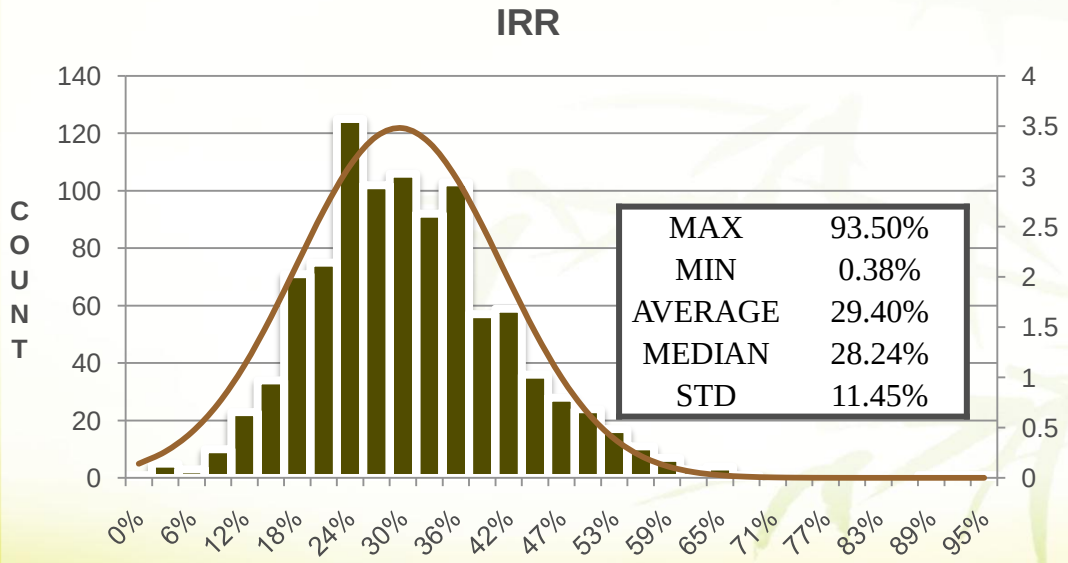
- C-ROSS & Economic Capital (EC)
  - C-ROSS: under industry-wide testing
    - 1st pillar quantifiable risk valuation (MC_{QR} and $NAV_{admissible}$)
    - 2nd pillar qualitative/control risk valuation (S and MC_{CR})
  - EC implementation
    - Not mandatory for Type II companies
    - Can increase S
    - Can serve as a supplementary risk metrics (short term 1-yr time horizon)
    - Methodology can be borrowed to improve risk budgeting process, e.g. setting risk budget for individual risks

ERM New Developments

- Credit Risk Modeling
  - Credit spread risk
    - Stochastic credit yield curve
  - Credit rating migration risk
    - Transition matrix of migration probability, random number simulations
  - Credit default cost
    - Default probability, recovery rate
  - Credit risk model
    - JLT, G3, etc.: 3rd party or home built
  - ALM model reflecting credit risk
    - Input or generate credit risk related information
    - Update credit assets valuation formula
    - Simulate random credit events

ERM New Developments

- ALM for Product Development
  - Distribution of pricing indicators (IRR, PM, etc.) under 1000 realistic economic scenarios
  - ALM strategy built in (SAA, dynamic behavior, etc.)
  - Risk metrics evaluated (EVaR/EV, CaR, LaR, etc.)



ALM (Stochastic Scenarios)		
Initial New Money Rate	5.57%	
Single Scenario	IRR	PM
	26.53%	8.91%
EV	189.07m	
EvaR	148.99m	
EVaR/EV	78.80%	

ALM Modeling

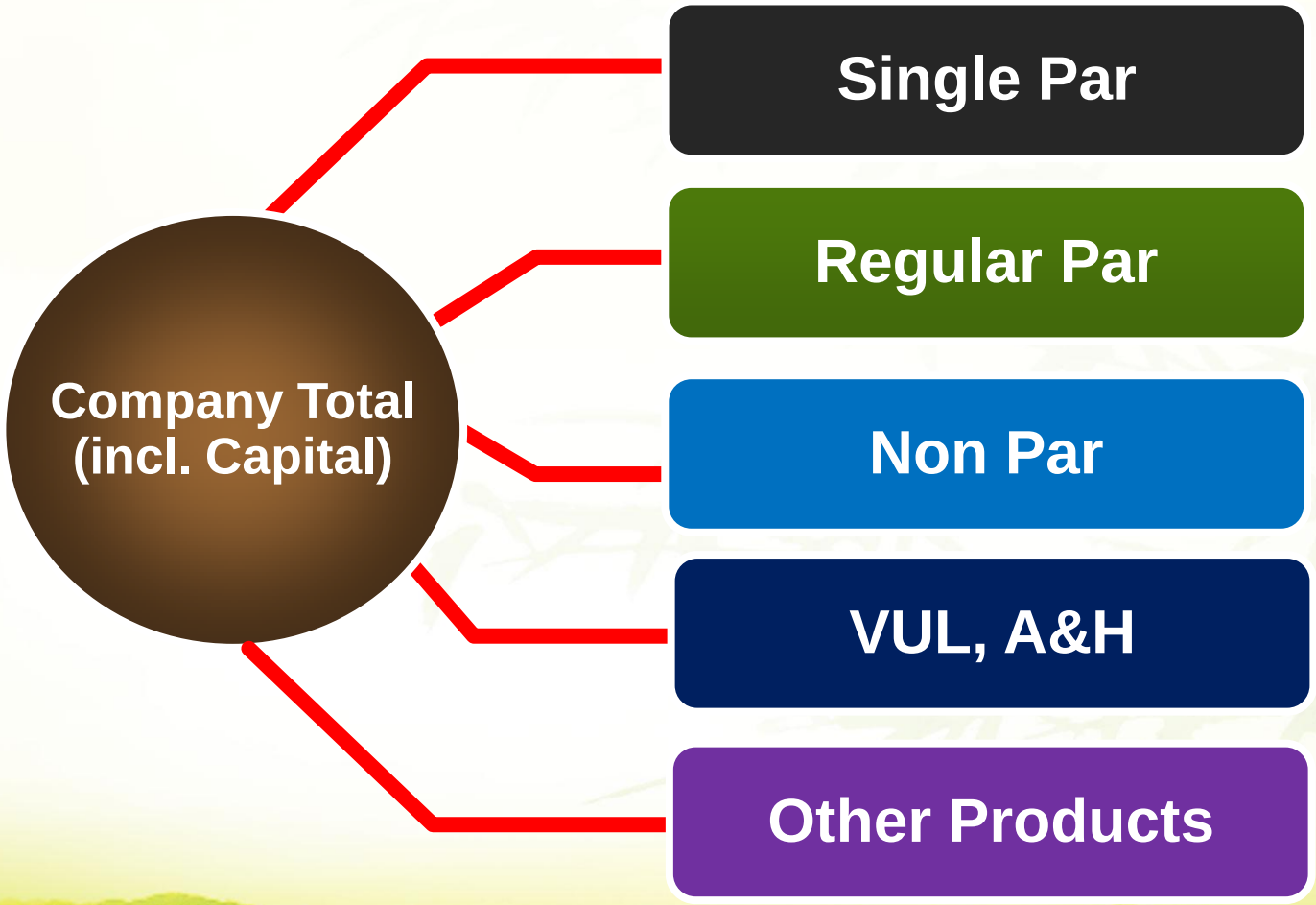
- Stochastic vs. Deterministic
  - Scenarios, ALM Strategy
  - Future projection
  - Stress test
  - Communication to senior management

ALM Modeling

- Dynamic vs. Static
  - Lapse
    - Policyholder behavior affected by market conditions, e.g. interest rate sensitive products
  - Dividend
    - Dividend scheme by weighing actual investment return and market competitor rates
  - SAA/TAA
    - Adjust according to macro economic conditions

ALM Modeling

- LOB & Company Total



ALM Modeling

- Accuracy vs. Runtime
  - Run time and capacity in dynamic stochastic ALM model
    - Software & Hardware
  - Smart model point compression technique
    - Reduce runtime while preserving accuracy, e.g. Milliman Cluster Modeling Tool
  - Option to go to Cloud Computing
  - Efficient simulation process
    - Allow quick rerun
    - Splitting out results by product segments for deeper analysis
  - MG-ALFA for ALM (also have Prophet to handle normal valuation)

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Thank You!

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