NAIC ORSA and Risk Capital

Southern California Casualty Actuarial Club

Winter 2014 Meeting
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Agenda

- Context and Background
- NAIC ORSA Overview
- Risk Assessment
  - Qualitative vs. Quantitative Approaches
  - Deterministic vs. Stochastic Approaches
  - Risk Aggregation and Correlations
- Pilot Feedback Projects

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What is ORSA?

- ORSA = Own Risk and Solvency Assessment
  - NAIC Model Law adopted in September 2012
  - NAIC Guidance Manual revised March 2013
  - Effective date: January 1, 2015
  - Currently adopted by 20 states
- A new regulatory requirement intended to:
  - Foster effective enterprise risk management
  - Provide a group level perspective on risk and capital
- Required of:
  - Companies with gross written premium over $500 million
  - Groups with gross written premium over $1 billion
  - Other entities in special circumstances (e.g., financial distress)

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Relevance for Smaller Companies?

- Potential for the NAIC to someday broaden the scope?
- Risk management best practice
- Show evidence of sound governance and risk management to regulators and rating agencies

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What is ORSA?

Process

- Component of ERM Framework
- Confidential
- Internal
- Appropriate to the scale, nature, and complexity of the insurer
- Consider material and relevant risks identified by the insurer
- Assessment of risks associated with the current business plan
- Assessment of sufficiency of capital resources to support risks

Summary Report

- Regulatory compliance
- Confidential
- Provided to regulator
- Describe ERM framework
- High level summary of risk assessment
- Group Assessment of Risk Capital
- Prospective Solvency Assessment

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International Context

- U.K. Financial Services Authority: Individual Capital Adequacy Standards (2005)
- Solvency II
- International Association of Insurance Supervisors (IAIS) Insurance Core Principles (ICP)
- Australia: Internal Capital Adequacy Assessment Process
- Bermuda: Stress and Scenario Testing
- Etc….

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U.S. Regulatory Context

Solvency Modernization Initiative

Capital Requirements

Governance & Risk Management

Group Supervision

Statutory Accounting & Financial Reporting

Reinsurance

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Risk Focus Financial Examinations

Connection to ORSA

- Both point to an apparent shift in regulatory philosophy
  - Deemphasize detailed prescriptive quantitative tests
  - Focus on principles of sound corporate governance and risk management
- Explicit links in the Guidance Manual:
  - "As part of the risk-focused analysis and/or examination process, the commissioner may also request…confidential supporting materials to supplement his/her understanding of the information contained in the ORSA summary report"
  - "The ORSA Summary Report may assist the commissioner in determining the scope, depth and minimum timing of risk-focused analysis and examination procedures"

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Risk Focused Financial Examinations

Changes to Actuarial Component

Old Process

- Independent analysis of loss and LAE reserves
- Evaluate reasonability of carried reserves
- No consideration of risk mitigation
- Minimal interaction with examiner
- Limited view of reserves only
- Historical balance sheet focus

New Process

- Substantive testing limited to moderate/high risk areas
- Evaluate internal controls on reserving process
- Consider risk mitigation strategies
- Continual interaction with examiner
- Broader view of multiple risks
- Prospective solvency focus

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NAIC ORSA Model Act

Risk Management Framework

- "…maintain a risk management framework
- to assist the insurer with
- identifying, assessing, monitoring, managing and reporting on
- its material and relevant risks."

ORSA Requirement

- "…a confidential internal assess-ment…
- of the material and relevant risks
- associated with the… current business plan,
- and the sufficiency of capital resources to support those risks."

ORSA Summary Report

- "…a confidential high-level summary of an insurer or insurance group's ORSA."

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Risk Management Framework

Key Principles

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Importance of Risk Appetite

- Risk appetite is key to long-term success of ERM program
- ERM = attempt to keep risk within risk appetite while achieving other corporate goals
- Foundational strategy choice:
  - Grow risk faster than capital (increase riskiness)
  - Increase capital faster than risk (increase stability)
  - Grow risk and capital together to maintain current balance between riskiness and stability

Summary Report

- Three main sections:
  1. Description of risk management framework
  2. Assessment of risk exposure
  3. Group risk capital and prospective solvency assessment

Enterprise Risk Management (ERM)

Economic Capital Model (ECM)

- Considerations in developing an ECM
  - Nature and complexity of risks
  - Financial position
  - Economic environment
- ECM should include
  - Stress testing
  - Stochastic simulation models

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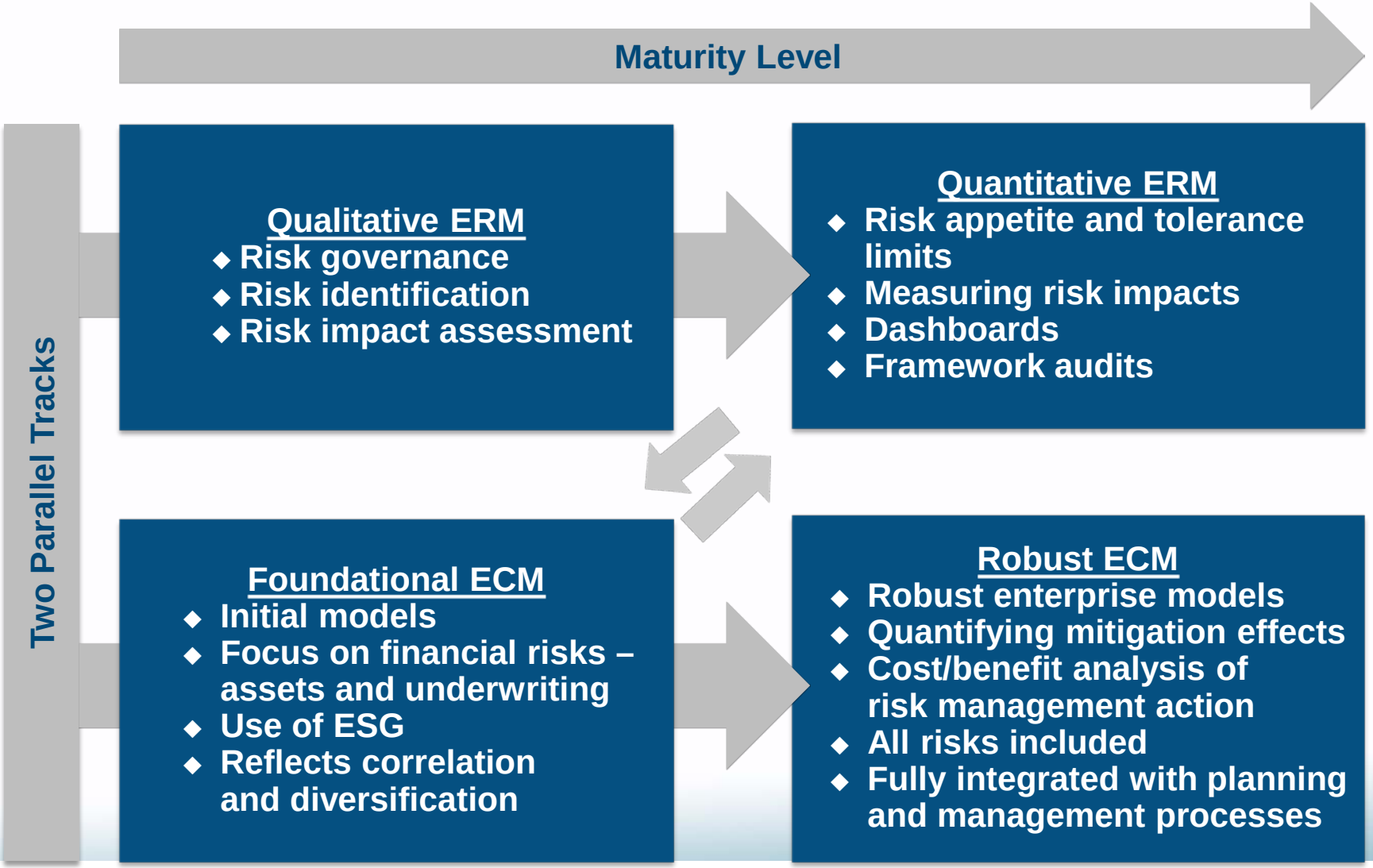
ERM / ECM Development



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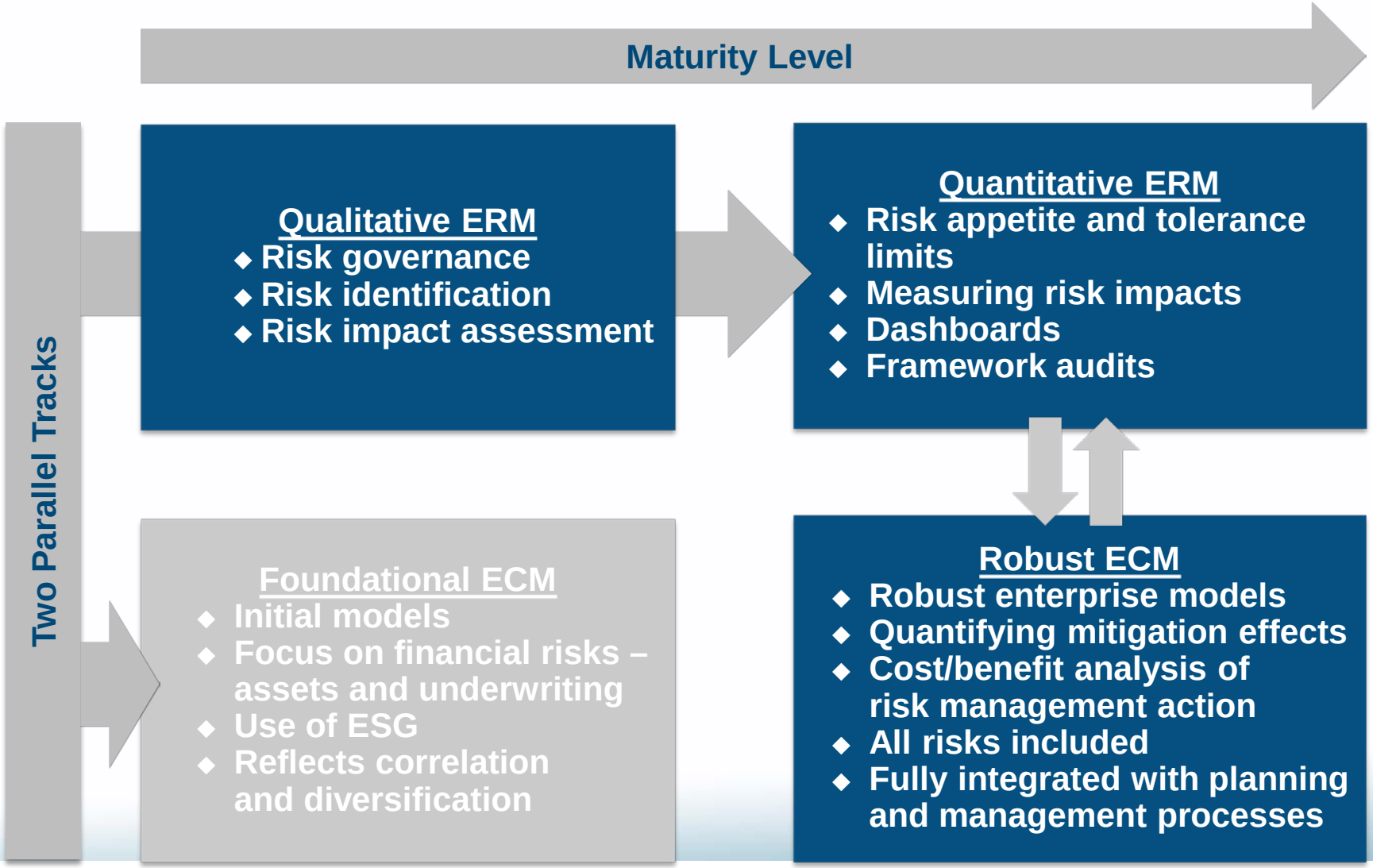
ERM / ECM Development



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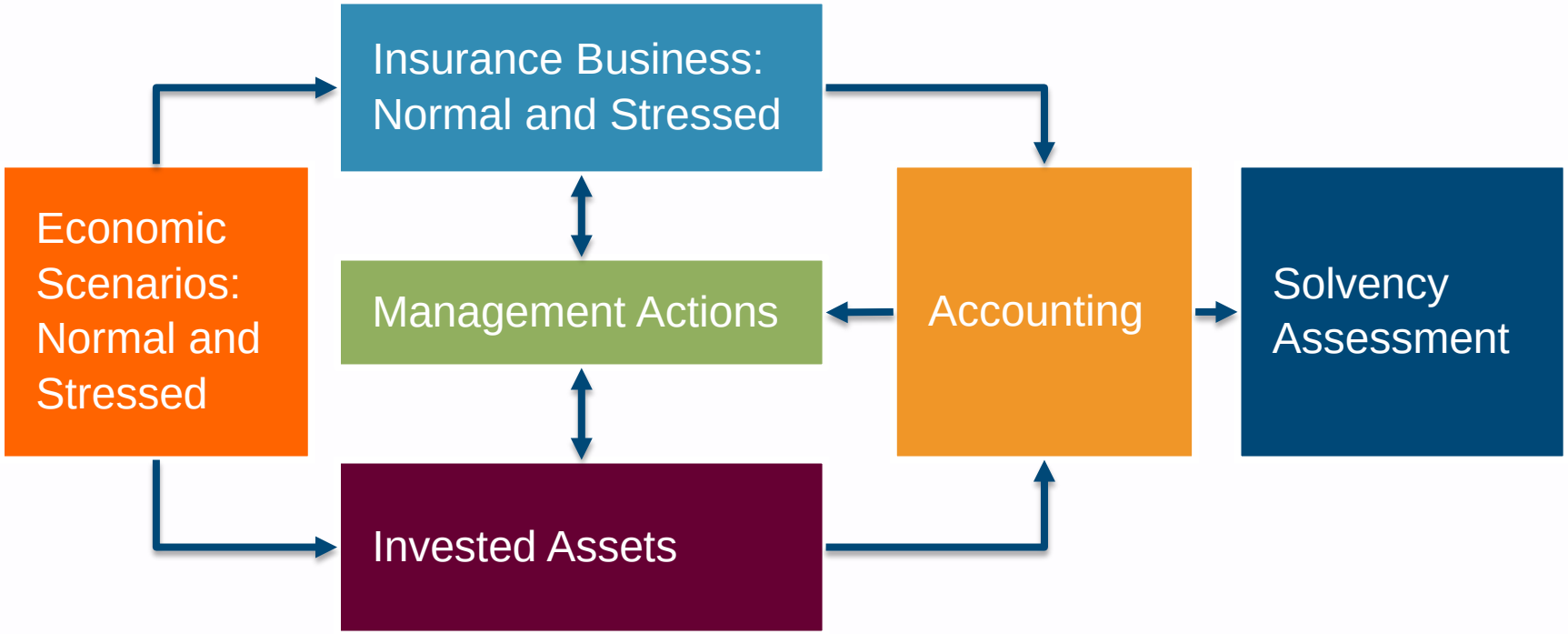
Economic Capital Model (ECM)

Simulation Architecture



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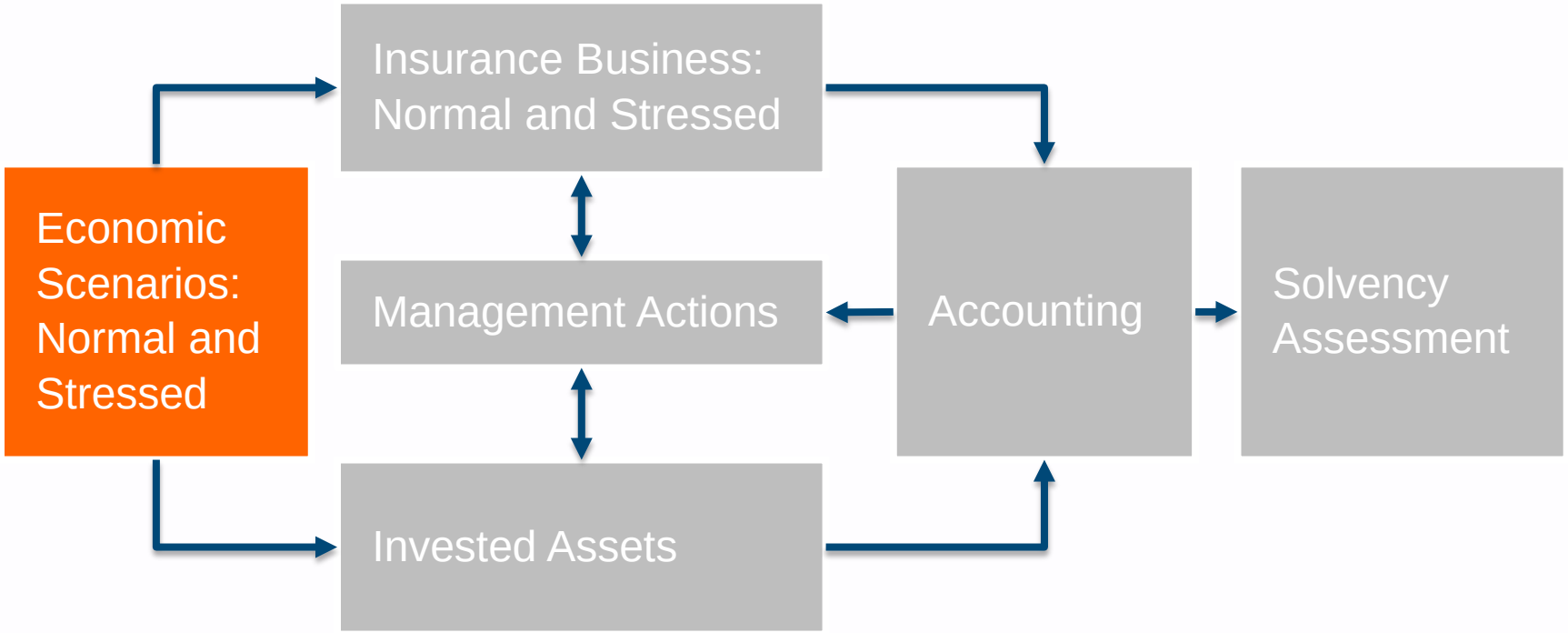

Macro-economic conditions:

- GDP level / growth rate
- Inflation rates / indices
- Yield curves / credit spreads
- Foreign exchange rates
- Unemployment rates
- Etc.

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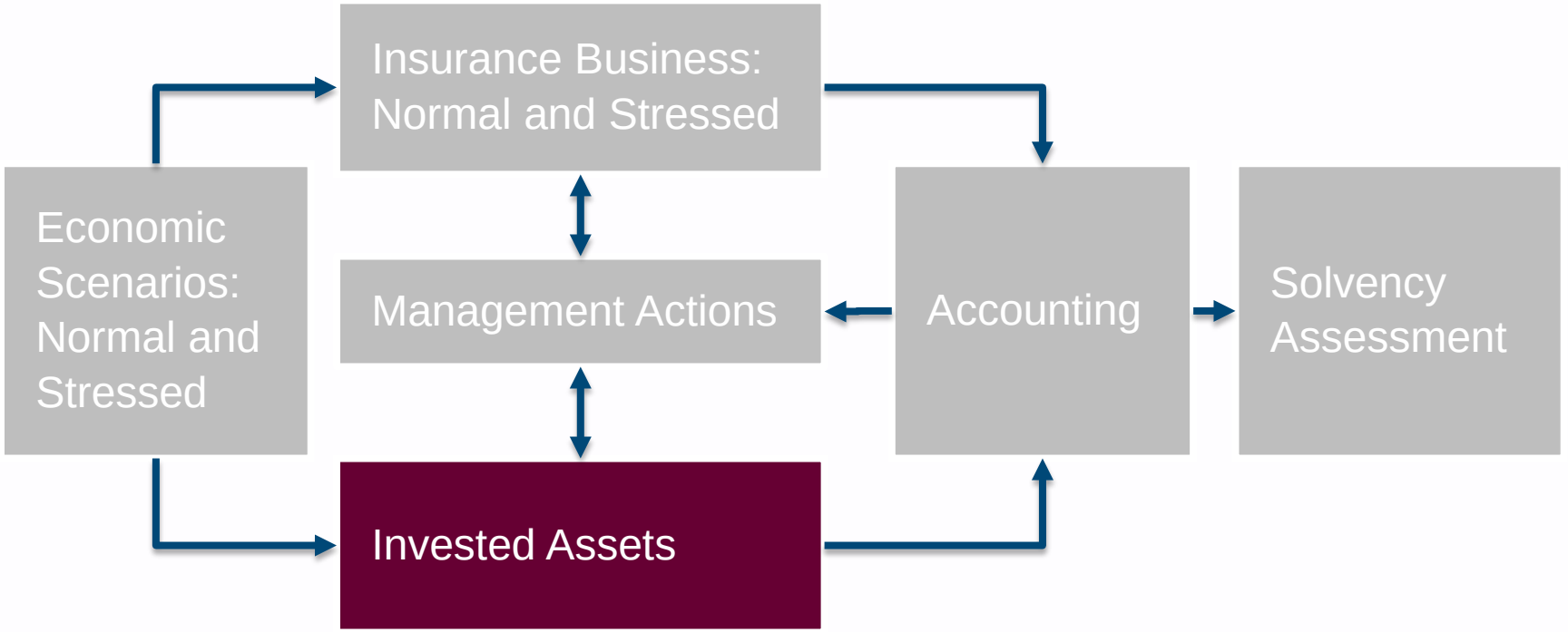
Economic Capital Model (ECM)

Simulation Architecture



Investment performance:
- Bond quality, default
- Interest income
- Market values

Investment management
- Trades / rebalancing
- Asset allocation
- Asset-liability management

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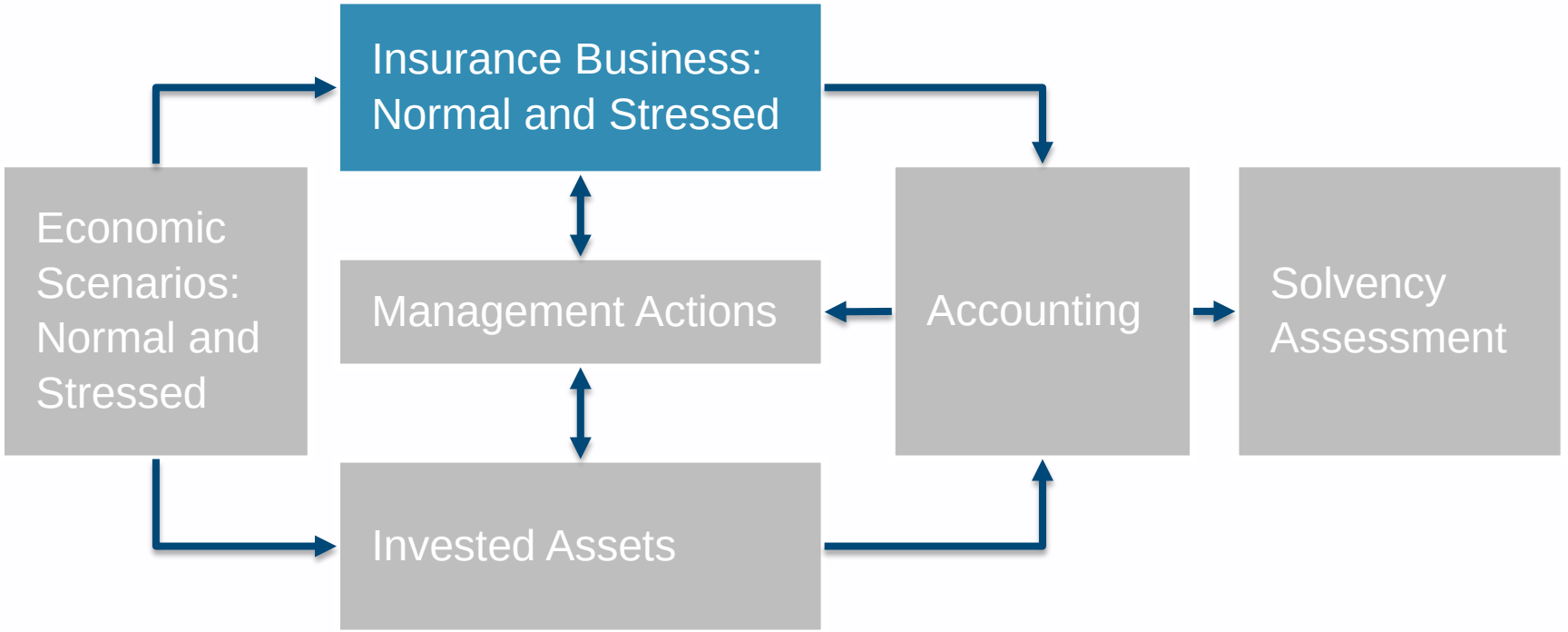
Economic Capital Model (ECM)

Simulation Architecture



Risk Categories
- Underwriting risk
- Reserve risk
- Credit risk

Possible Risk Drivers:
- Inflation
- Unemployment
- Etc.

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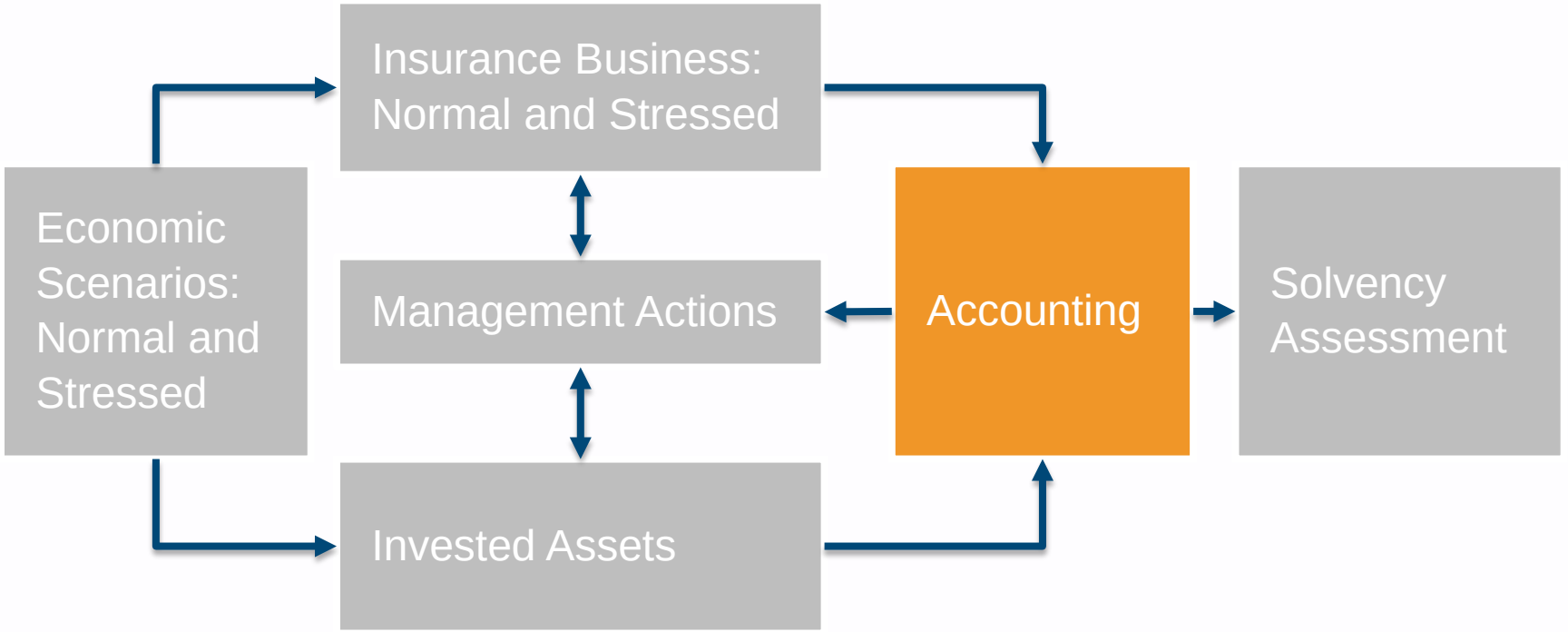
Economic Capital Model (ECM)

Simulation Architecture



Risk aggregation – Company & Group

- Balance sheet
- Income statement
- Cash flow statements
- Taxes
- Regulatory solvency measures
- Rating agency capital adequacy

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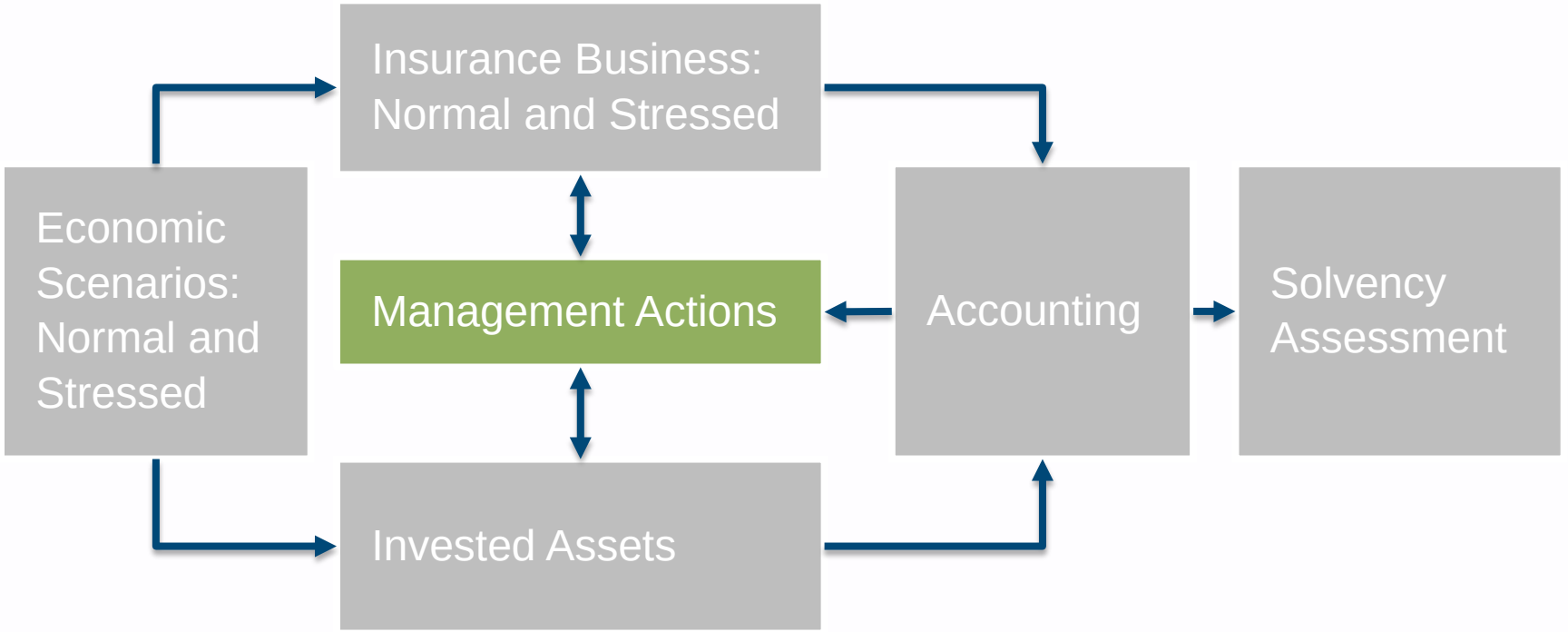
Economic Capital Model (ECM)

Simulation Architecture



ORSA time horizon: “longer term business cycle, such as the next 2-5 years”
How will management respond to changing conditions?
Key to integrating ECM within ERM framework.

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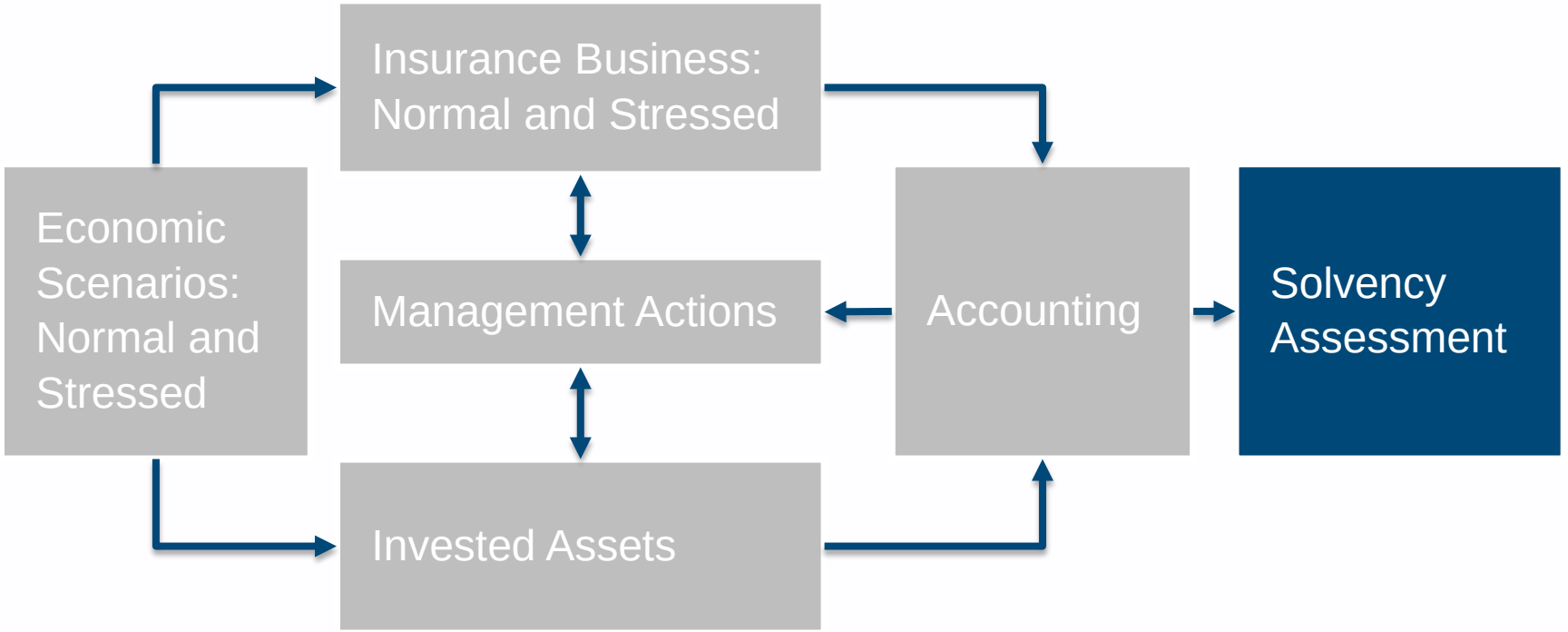
Economic Capital Model (ECM)

Simulation Architecture



- Model output
- Risk appetite
- Risk tolerances

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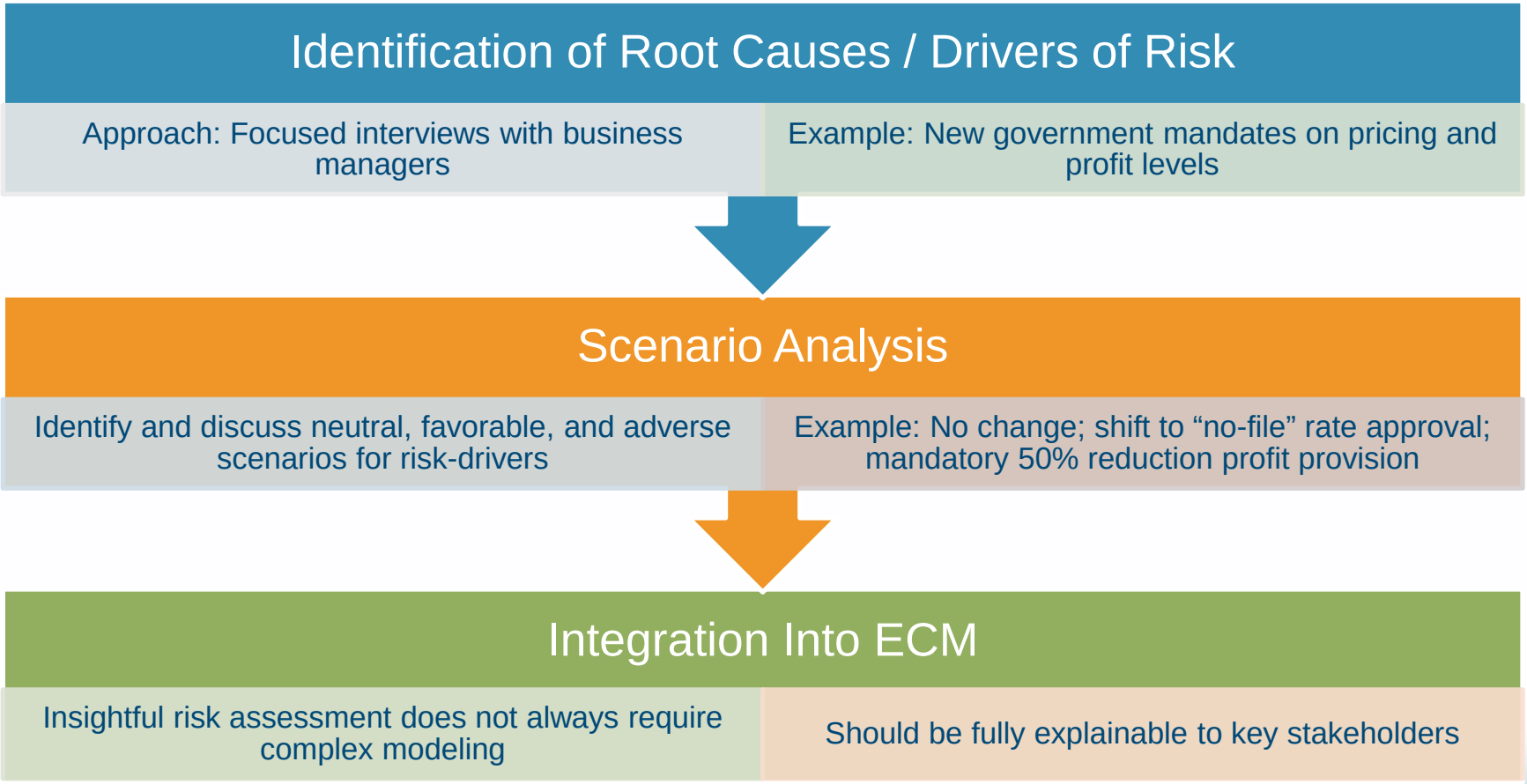
“Non-Quantifiable” Risks

Example: “Regulatory Risk”



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Stress Tests or Stochastic Models?

- Value in both
- NAIC ORSA Guidance Manual mentions both approaches without indicating a preference
- Complementary strengths and weaknesses
- Consider the company's prioritization of ERM objectives

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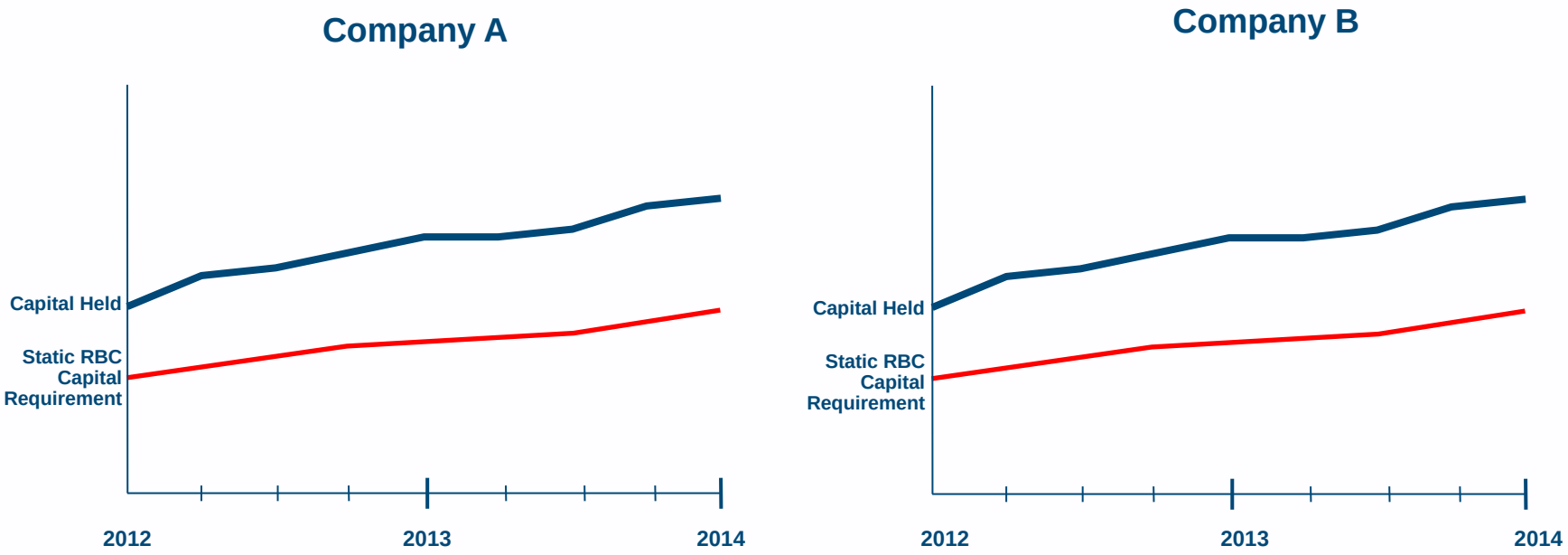
ERM Objectives

- Compliance with rating agency and regulatory requirements
- Measuring risk (typically to determine the required risk capital)
- Diversifying risk – no concentration of exposure that could threaten the solvency of the firm
- Loss control
- Pricing risk – exploiting risk by assuring that the margins for risks accepted are adequate to achieve desired levels of return
- Risk-reward steering – informing the planning process to encourage further investment in the business opportunities that produce the best combined risk and return for the entire firm
- Supporting success – increase the likelihood that the firm will achieve its objectives and identify new opportunities

Stress Test Modeling



Two companies, same balance sheet and mean growth forecast → same capital requirement under standard RBC formula

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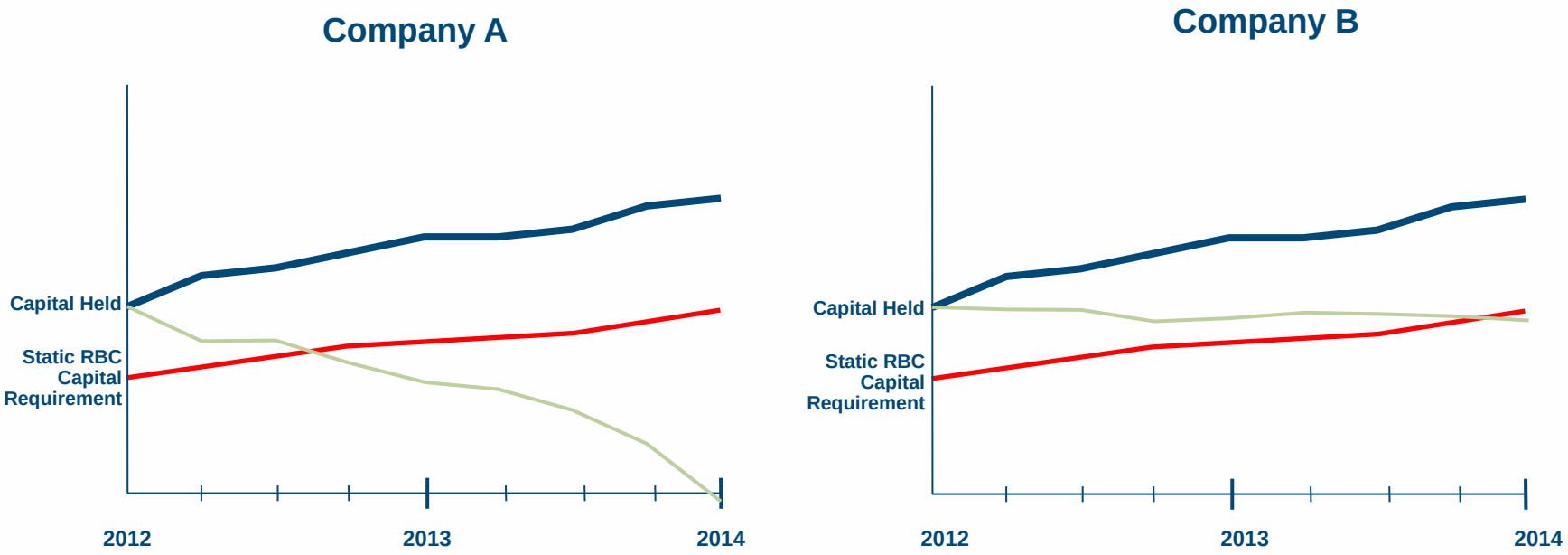
Stress Test Modeling



- Two companies, same balance sheet and mean growth forecast → same capital requirement under standard RBC formula
- Stress test model asks what happens under a single, specific alternative set of conditions (green lines), e.g., an adverse economic environment
- Greater impact on Company A → greater need for capital to remain above minimum thresholds

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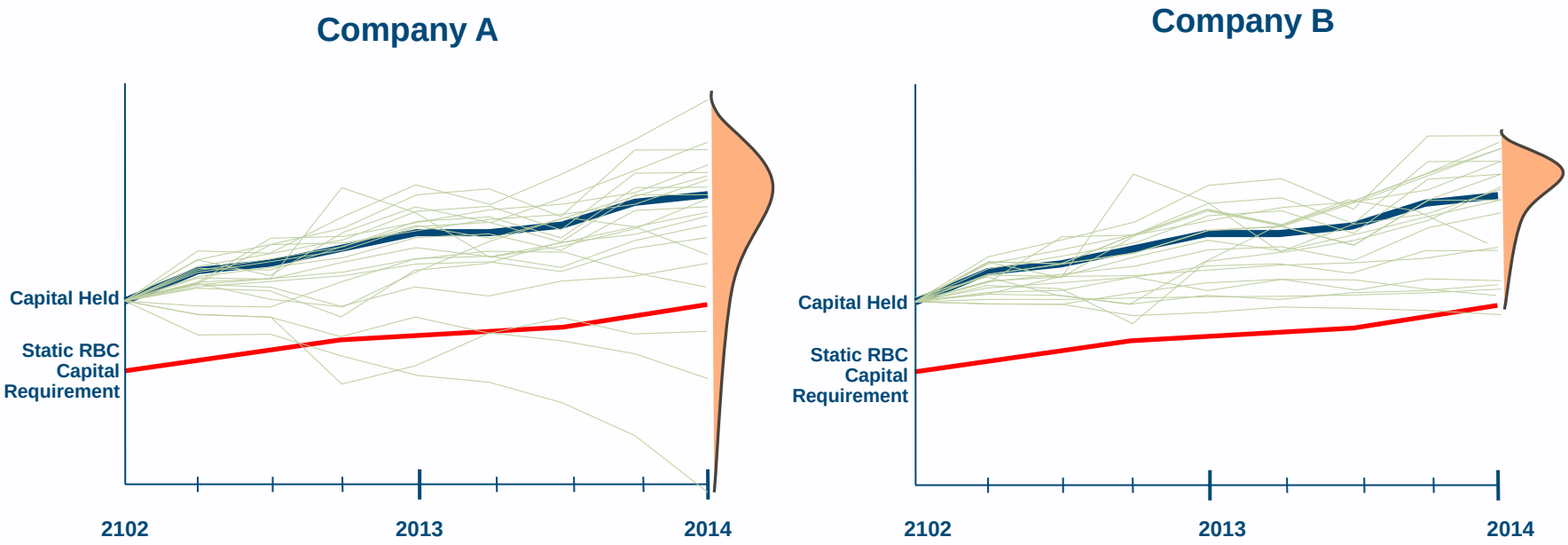
Stochastic Risk Modeling



- Two companies, same balance sheet and mean growth forecast → same capital requirement under standard RBC formula
- Stochastic risk model shows range of possible scenarios
- Company A has much greater potential for upside and downside variation → greater need for capital to remain above minimum thresholds

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Deterministic vs. Stochastic Models

	Advantages	Disadvantages
Deterministic Stress Test **(single "what-if" scenarios)**	• Easy to implement • Can re-create actual historical events • Simple cause & effect structure • Easy to understand risk drivers, interpret results, explain	• Incomplete picture • Limited by modeler's imagination • Prone to behavioral biases • Single scenarios are insufficient basis for strategic decision-making
Stochastic Model **(potentially thousands of scenarios processed simultaneously)**	• More complete picture • Range of results & probability reflected in distributions • More useful information about the potential outcomes of strategic decisions	• Can be difficult to parameterize – need to calibrate both body and tail of distribution • Complexity of output • May be more difficult to interpret & explain

Best practice is to employ both approaches and use a long historical data set, which includes historical stress events.

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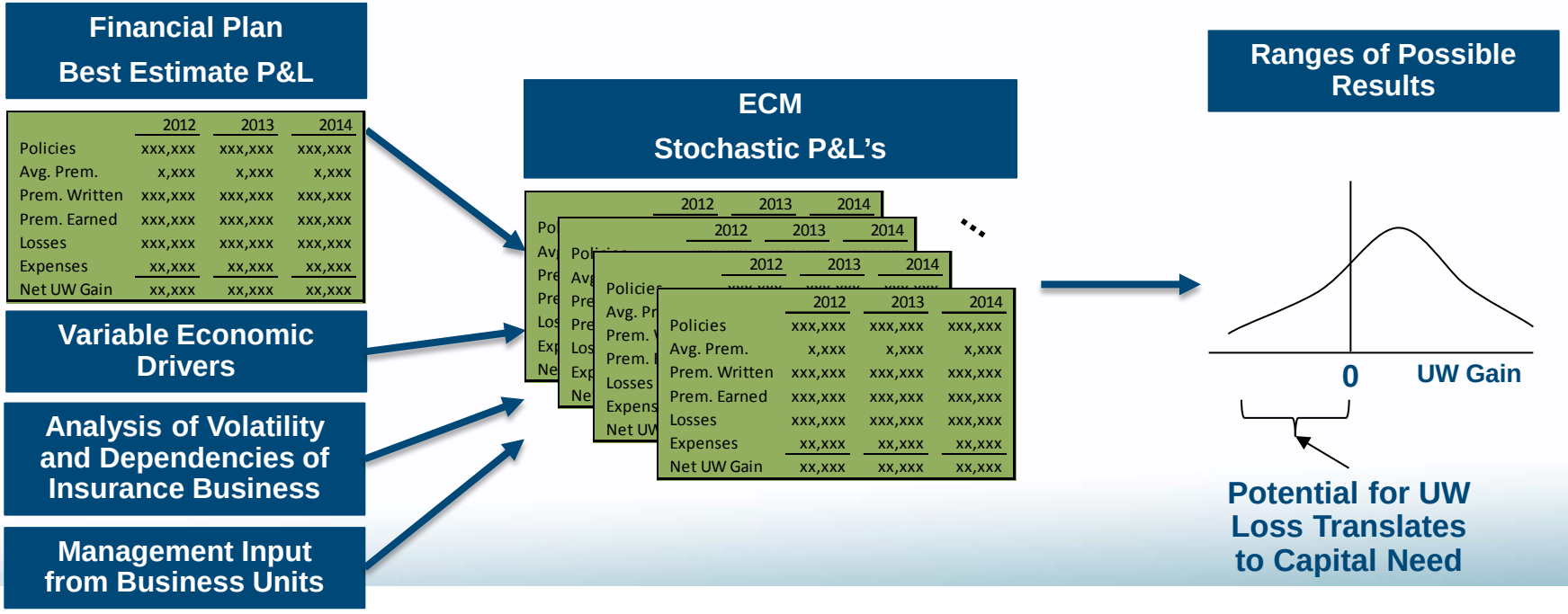
ECM as a "Stochastic P&L" System

- Moving parts of ECM ↔ Lines of a P&L
- Expected values tie directly to the financial planning process
- Variability is based on (1) analysis of data, (2) substantial input from business leaders and (3) economic factors
- Result is a "stochastic P&L" estimating the probability distribution of potential outcomes



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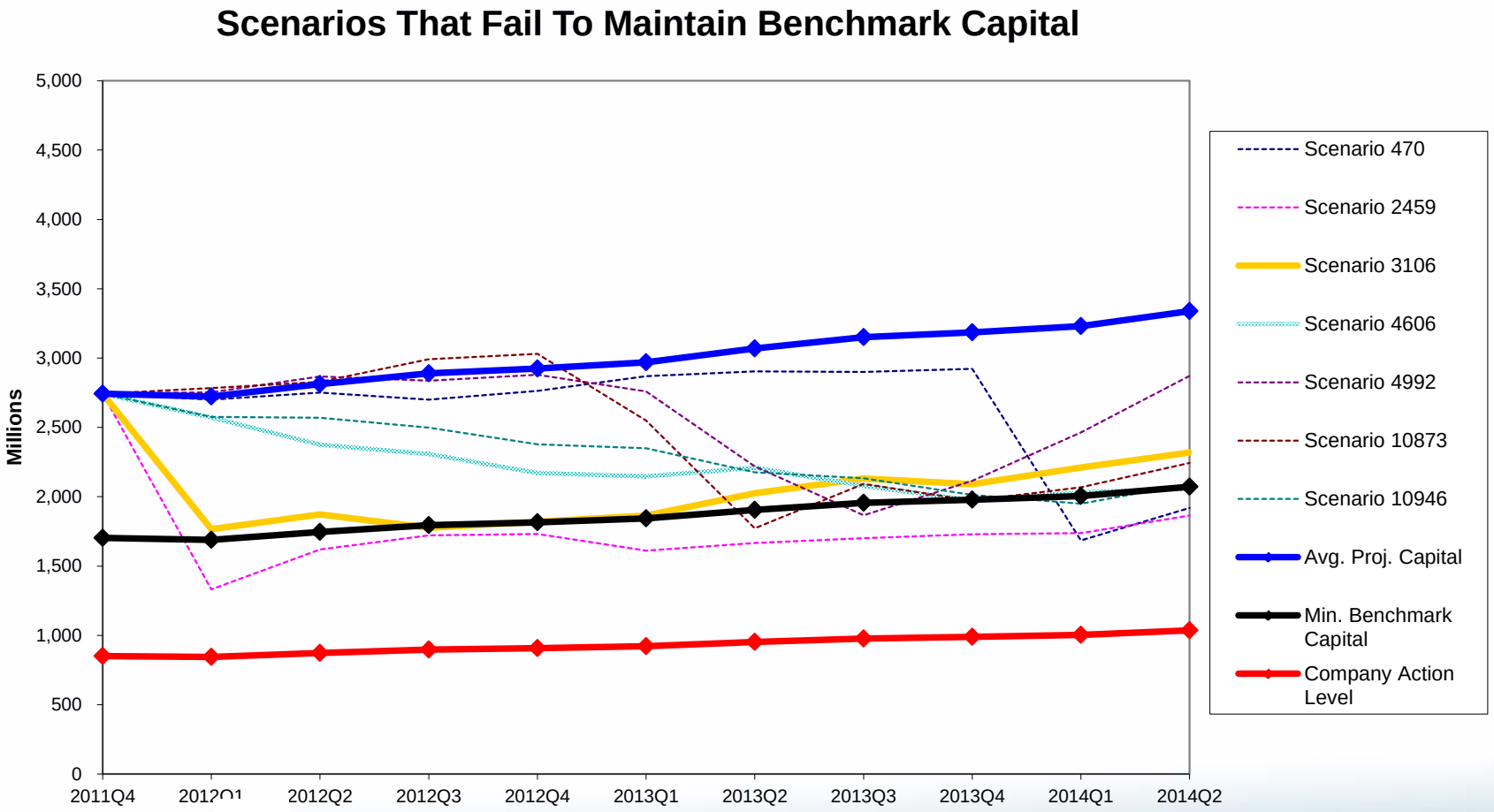
Analysis of Adverse Scenarios



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Analysis of Adverse Scenarios

- Well-constructed ECM should enable “drill-down” into the details of specific adverse scenarios
  - Model validation
  - Identification of key drivers of tail risk
  - Formulation of management response to risk exposure
  - Connect ECM output to ERM process
- Appropriate aggregation and risk correlation is critical

Scenario Number and Description of Capital Impairing Events

470 – Reputation damage and subsequent loss of market share
2,459 – Reputation damage, loss of market share, adverse claim trend preventing recovery
3,106 – Unexpected investment losses, loss of key account, inability to fully achieve price increases
4,606 – Sustained adverse claim trend, inability to fully recover with price increases, loss of membership
4,992 – Unexpected losses due to poor underwriting, adverse results of market conduct
10,873 – Adverse regulatory action in key markets
10,946 – Sustained adverse claim trend, inability to fully recover with price increases, loss of membership

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Aggregation and Diversification

Modeling Considerations

Guidance Manual mentions several approaches

- Simple summation of capital requirements for individual risk
- Correlation matrices
- Dependency structure (i.e., “cause and effect” models)

Correlation Matrices / Copulas

- Example:
  - Two product lines both affected by medical inflation
  - Impact both prior-year reserves and future underwriting results
- Specify correlation coefficients to quantify the dependency between these four risks

	Line A Reserves	Line B Reserves	Line A Future Loss Ratio	Line B Future Loss Ratio
Line A Reserves	1.00	?	?	?
Line B Reserves		1.00	?	?
Line A Future Loss Ratio			1.00	?
Line B Future Loss Ratio				1.00

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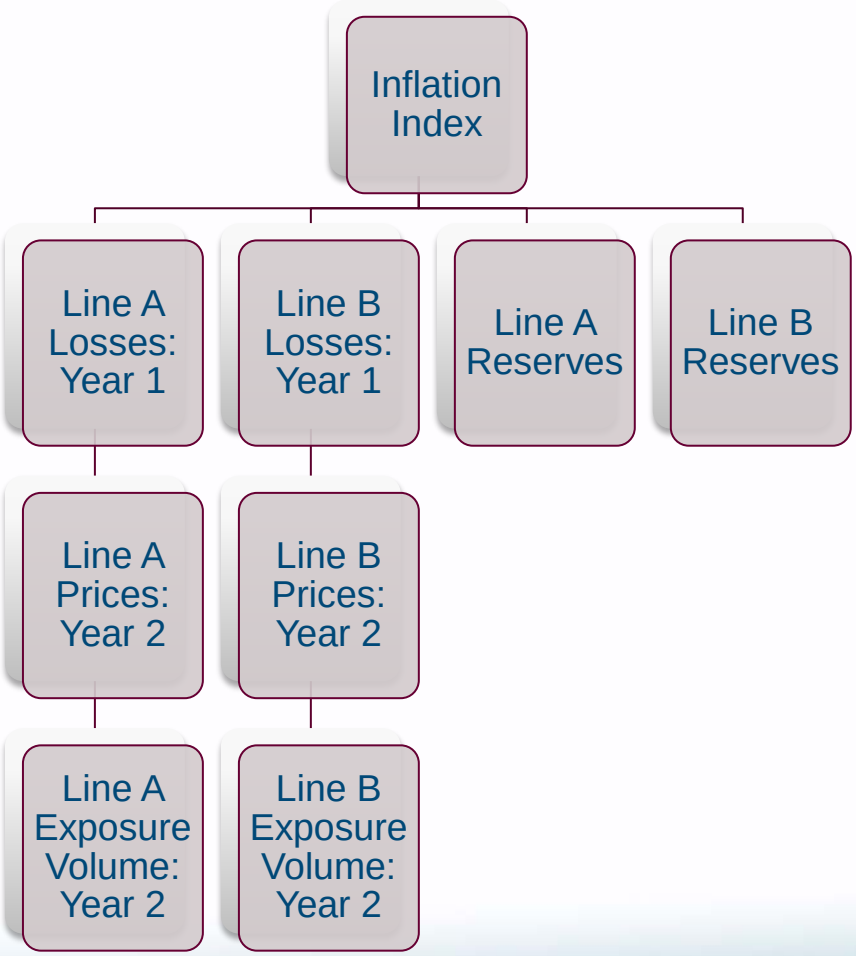
Structural Dependency Models

- Example:
  - Two product lines both affected by medical inflation
  - Impact on both prior-year reserves and future underwriting results
- Implicit modeling of the dependency through direct cause-and-effect relationship



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Copula vs. Structural Dependency

Copula / Correlation Matrix

- Ad hoc dependency structure
  - Difficult to explain, justify
  - Difficult to interpret
  - Difficult to estimate parameters
  - Hides info about risk drivers
- Limited modeling options
  - Continuous, monotonic relationships
  - Fixed number of parameters
  - Limited ability to model difference kinds of dependency at different points on the distributions (

Structural Dependency

- Follows from understanding of business operations
  - Easy to communicate and interpret
  - Allows for active management participation in the modeling process
  - Illuminates risk drivers
  - Helps identify risk mitigation strategies
- Virtually unlimited modeling options
  - Can add as many dependency variables as needed
  - Can specify any relationship

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ORSA Feedback Pilot Project

- NAIC invited insurers to voluntarily submit an ORSA summary report
- Three rounds: 2012, 2013, 2014
- Opportunity to get feedback from regulators
- Opportunity to help identify items in the Guidance Manual that need to be revised
- 2014 project is still underway

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ORSA Feedback Pilot Project

Specific Feedback from NAIC

- Connection between Summary Report and ORSA report presented to the board
- Multi-year data to illustrate trends
- Discussion of changes in risk appetites and tolerances
- Prospective discussion of risks
- Risk mitigation activities
- Impact of combined stress scenarios
- International groups should include overall group capital

ORSA Feedback Pilot Project

Specific Feedback from NAIC

- Address these specific risk sources:
  - Emerging risks
  - Risks associated with intercompany dependencies
  - Technology risk
- Risk ranking / rating / prioritization
- Expect to schedule a meeting / webinar / conference call to walk through the report with the regulator

ORSA Feedback Pilot Project

Specific Feedback from NAIC – Readability!

- Table of contents
- Executive summary
- Mapping of legal entities to business units described in report
- Glossary of terms and acronyms
- Explanations of tables and graphs
- Use heat maps
- Use graphs to compare output of different models
- Use current data
- Be prepared to provide supporting documents mentioned in the report