ENTERPRISE RISK MANAGEMENT SYMPOSIUM

Bridging the Gap from Key Risk Assessment to Economic Capital Modeling

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Agenda

- What Is The Gap?
  - How Risk Factors Should Be Incorporated In Economic Capital Models
  - Challenges
- How To Cross The Gap
  - Methodologies for Addressing “Hard to Quantify” Risks
- Organizational Considerations
  - How Different Parts of the Organization Must Work Together

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Economic Capital Models Should Encompass All Major Risks

- Robust risk models on both sides of the balance sheet
  - Economic Scenarios
  - Assets – Market risk
  - Assets – Credit risk
  - Insurance – Reserving risk
  - Insurance – Underwriting risk
  - Strategic risk
  - Operational risk

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Economic Capital Model – Implementation Stages

- Inventory risk factors
  - Prioritize by impact
  - Identify basis for risk assumptions (actuarial data, risk assessments, etc.)
  - Determine suitable approach for each risk
- Develop scenarios for each risk factor
  - How bad can it get
  - One year vs. multi year impacts
  - Management/market responses
- Run scenarios through P&L and balance sheet
- Aggregate distributions of scenario results to generate capital risk metrics

Potential Risks & ECM Treatment (Healthcare Example)

Potential Risk Factors	Detailed Approach Based On Actuarial/Statistical Internal Models	Simplified Approach Based On Management Input/Judgment	Risk Distribution Derived from an ERM Risk Assessment
Medical Trend	✓		
CMS Star Rating	✓		
Cyber Security Risk			✓
ACA Regulation Impact - Risk Adjustment		✓	
ACA Regulation Impact - Reinsurance		✓	
ACA Regulation Impact - Risk Corridors		✓	

- Must prioritize by materiality, not by ease of quantification
- Materiality should be considered relative to the chosen risk metric(s)
- Must then make realistic assessment of feasible quantification approach

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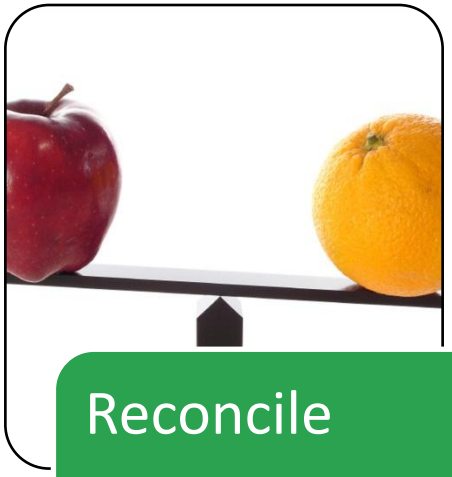
Prepping Op/Strat Risks for ECM

Identify, Rank

- Define
- Identify
- Prioritize

Parameterize

- Exposure levels
- Impact types
- Duration
- Correlations



Reconcile

- Feedback loop
- Exposure adjustments

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Identifying the Top Op/Strat Risks

Executive

Subsidiaries

Functions

Divisions

Business units

Risk owners

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Top Risks – Other Sources

- Existing risk disclosures
- Environmental scanning
- Peer benchmarking
- Multi-level risk identification
- Functional collaboration
- Explicit risk consolidation

Prioritizing the Top Op/Strat Risks

- Highest ordinal rankings
  - Likelihood, impact, and control effectiveness
- Hierarchical mentions
- Multiple mentions
- New and substantial risk exposures

Prepping Op/Strat Risks for ECM

Identify, Rank

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- Prioritize

Parameterize

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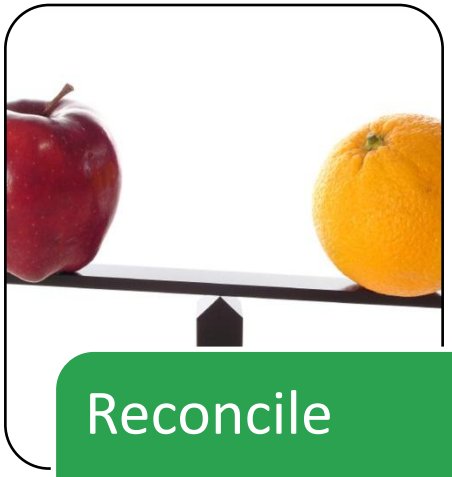

Reconcile

- Feedback loop
- Exposure adjustments

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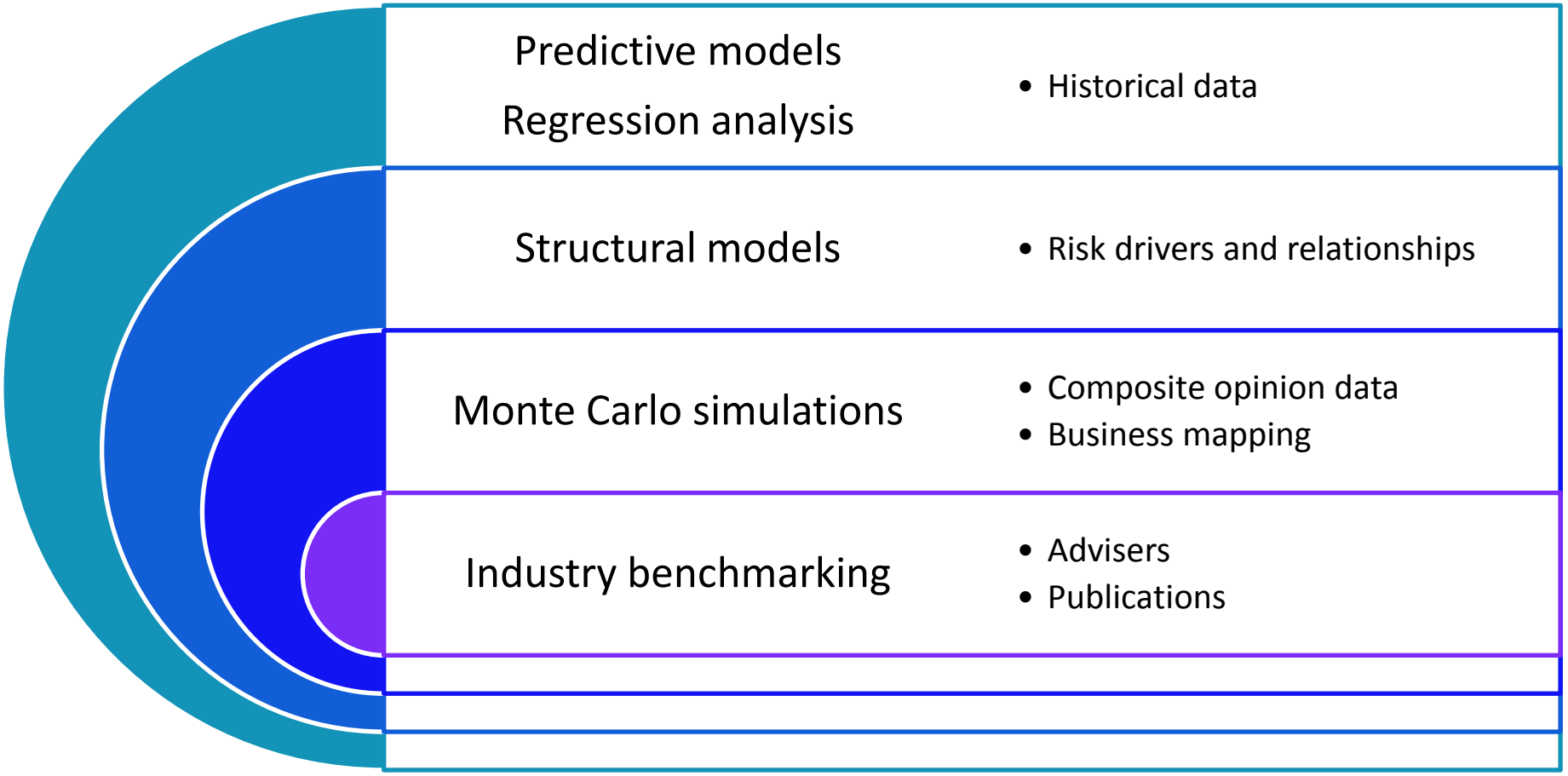
Parameterizing Op/Strat Risks

- Likelihood/frequency
- Impact(s)
- Line items
- Durations
- Management reactions
- Correlations/dependencies

Parameterizing Op/Strat Risks Over Time



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Parameterizing Op/Strat Risks – Iterative Process

- Scale rankings from ERM workshops
- Facilitated information gathering
- Formal, documented consolidation
- Socialization of quantification and model results
- Methods in tune with nature, scale, and level of complexity

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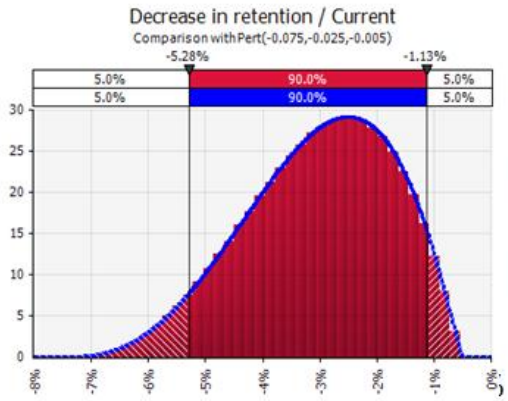
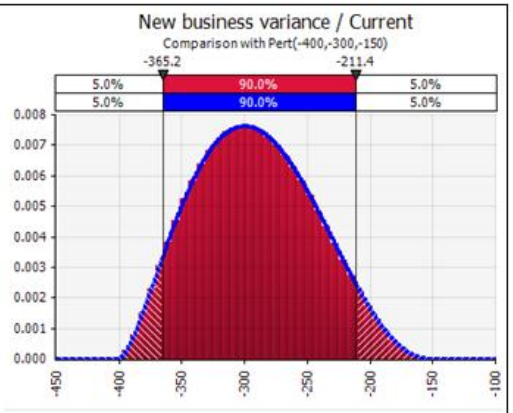
Identifying Key Sources of Uncertainty

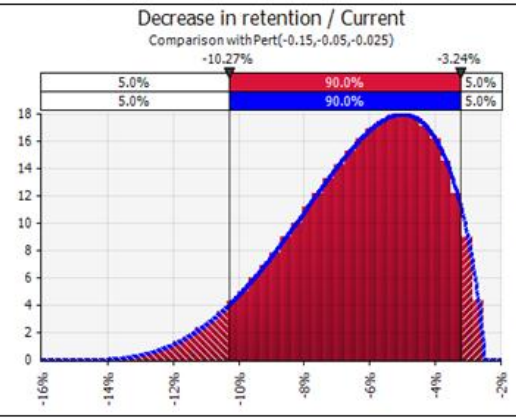
- Most common trigger events can be quantified
- Important to consider relationships

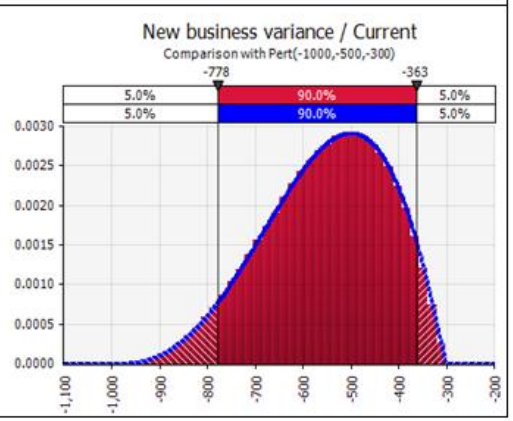
New competition





Loss of member funding





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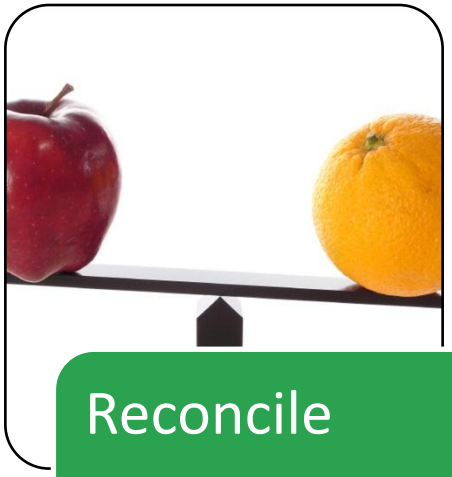
Prepping Op/Strat Risks for ECM

Identify, Rank

- Identify
- Prioritize

Parameterize

- Exposure levels
- Impact types
- Duration
- Correlations



Reconcile

- Feedback loop
- Exposure adjustments

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Reconciling to Avoid Double-Counting

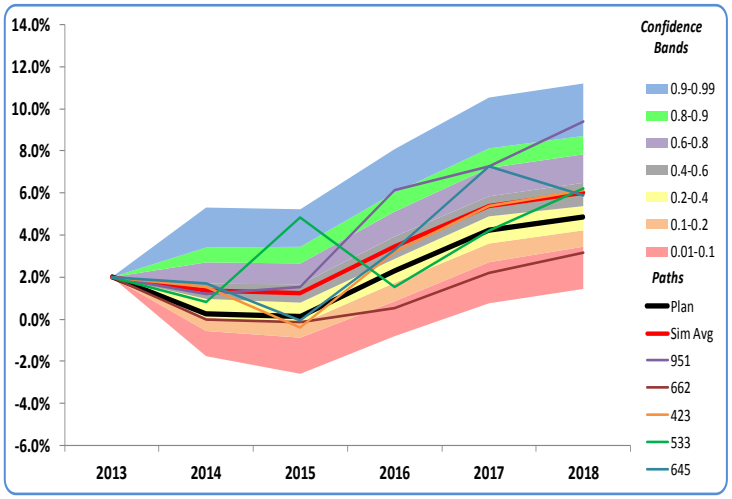
- Against FP&A
- Against other risks in ECM
- Formal, documented reconciliation
- Methods in tune with nature, scale, and level of complexity

Formal Reconciliation Checklist

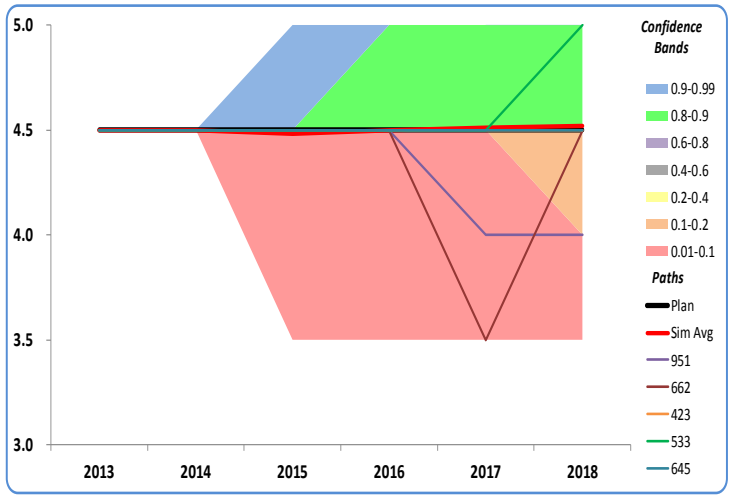
	Risk Source		Model Approach			
Key Risks	ERM Program Identified Risks	FP&A Specific Key Risk Drivers	Detailed Structural Stochastic Modeling	Simple Stochastic Modeling Based on Input from FP&A	Risk Distribution Derived from ERM Risk Assessments	Residual Standard Deviation of Historical IOI
Risk 1		✓	✓			
Risk 2	✓	✓	✓			
Risk 3	✓	✓		✓		
Risk 4	✓	✓		✓		
Risk 5	✓	✓		✓		
Risk 6	✓				✓	
Other Risk						✓

Risk Driver Variability
Government Healthcare Segment Example

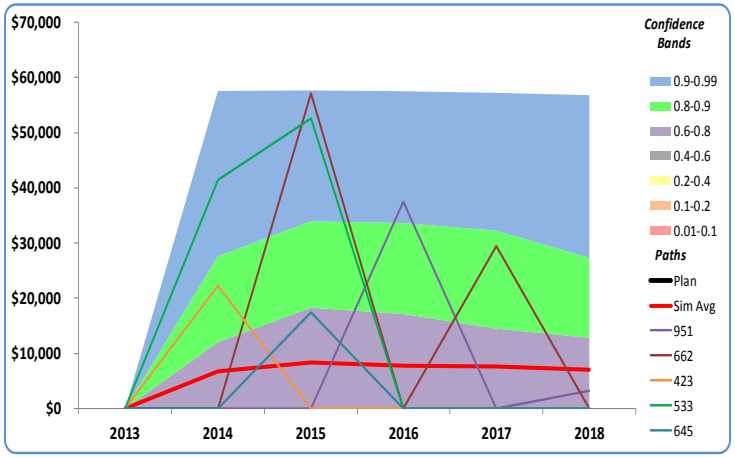
GOVT: Medical Trend Rate



GOVT: Simulated CMS Star Rating (Internal)



GOVT: Cyber Security Risk Dollar Impacts ($ in 000's)



- Source: ADVISE® model; Simulation = 1,000 paths

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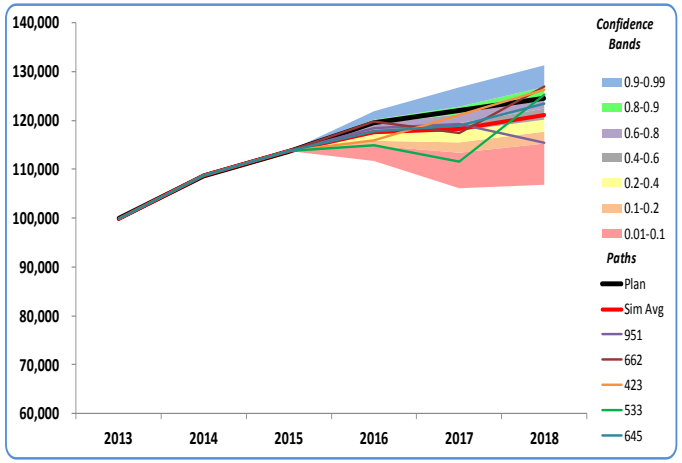
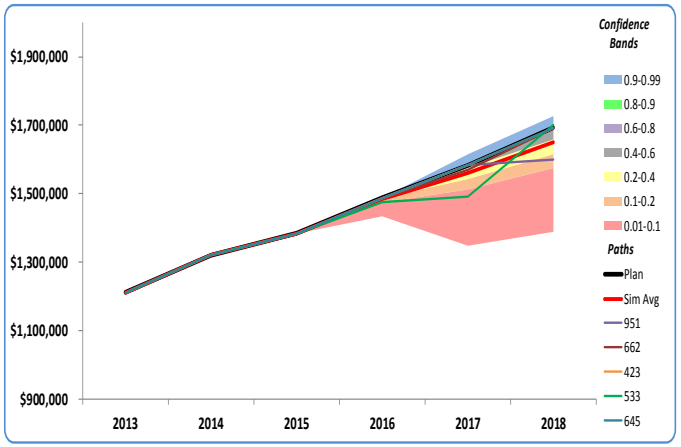
P&L Results Variability
Government Healthcare Segment Example

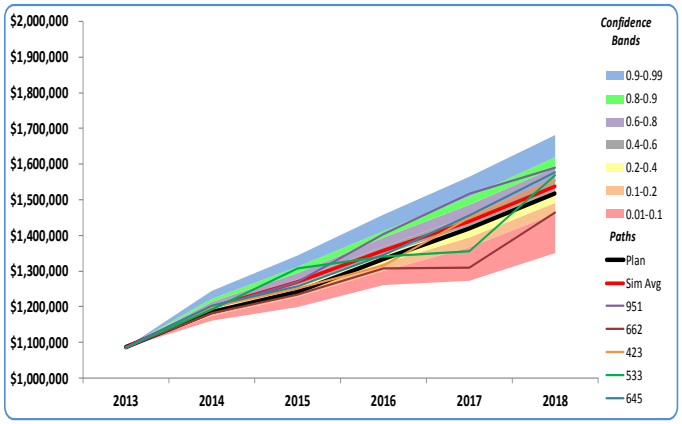
GOVT Membership



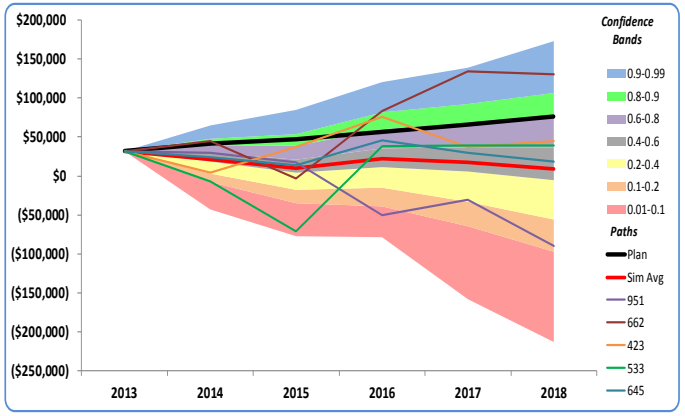
GOVT PremiumRevenue ($000s)



GOVT MedicalClaimsExpense ($000s)



GOVT OperatingMargin ($000s)



ENTERPRISE RISK MANAGEMENT SYMPOSIUM

Source: ADVISE® model; Simulation = 1,000 paths

One Adverse Path vs Plan Expectation
Government Healthcare Segment Example

Cause-and-effect modeling "tells the story", leading to greater transparency & understanding ...

Operating Margin:

	2013	2014	2015	2016	2017	2018
Expected (Plan)	**$ 31,708,046**	**$ 41,313,837**	**$ 46,943,544**	**$ 56,710,310**	**$ 65,987,192**	**$ 76,644,742**
Total Revenue (Higher / (Lower))	$ (0)	$ (0)	$ -	$ 0	$ (0)	$ (77,690,829)
Total Cost of Benefits ((Higher) / Lower)	$ (0)	$ (11,230,794)	$ (29,375,587)	$(107,197,984)	$ (96,990,810)	$ (88,929,023)
Net Admin Expense ((Higher) / Lower)	$ -	$ -	$ -	$ -	$ -	$ -
Actual (Path = 951)	**$ 31,708,046**	**$ 30,083,042**	**$ 17,567,956**	**$ (50,487,673)**	**$ (31,003,619)**	**$ (89,975,109)**

Total Cost of Benefits:

	2013	2014	2015	2016	2017	2018
Expected (Plan)	**$1,104,868,979**	**$1,204,289,981**	**$1,261,176,105**	**$1,354,775,921**	**$1,441,210,812**	**$1,539,520,398**
Medical Trend Impact	$ -	$ 11,230,794	$ 29,375,587	$ 82,898,231	$ 132,601,170	$ 213,596,868
IT Operational Risk Impact	$ -	$ -	$ -	$ -	$ -	$ -
Cyber Security Risk	$ -	$ -	$ -	$ 37,496,749	$ -	$ 3,192,448
Membership Impact	$ 0	$ 0	$ (0)	$ (13,196,996)	$ (35,610,359)	$ (127,860,292)
Actual (Path = 951)	**$1,104,868,979**	**$1,215,520,775**	**$1,290,551,691**	**$1,461,973,905**	**$1,538,201,622**	**$1,628,449,421**

Total Revenue:

	2013	2014	2015	2016	2017	2018
Expected (Plan)	**$1,210,883,595**	**$1,320,802,066**	**$1,383,693,888**	**$1,487,438,343**	**$1,583,529,875**	**$1,692,878,672**
Membership Impact (Internal CMS Star)	$ -	$ -	$ -	$ -	$ -	$ -
Membership Impact (Competitor CMS Star)	$ -	$ -	$ -	$ -	$ -	$ -
Prem Rev PMPM Impact (CMS Star)	$ -	$ -	$ -	$ -	$ -	$ -
Mgt Reactions (Mbrshp & Prem Rev PMPM)	$ (0)	$ (0)	$ -	$ 0	$ (0)	$ (77,690,829)
Actual (Path = 951)	**$1,210,883,595**	**$1,320,802,066**	**$1,383,693,888**	**$1,487,438,343**	**$1,583,529,875**	**$1,615,187,844**

At a very basic level, Operating Margin is much lower than expected due to higher Cost of Benefits and lower Revenue

Higher Cost of Benefits heavily driven by unfavorable Medical Trend with some impact from Cyber Security Risk

Management response is to increase prices (limited) & shed membership – lower membership lowers the Cost of Benefits, but also Revenue

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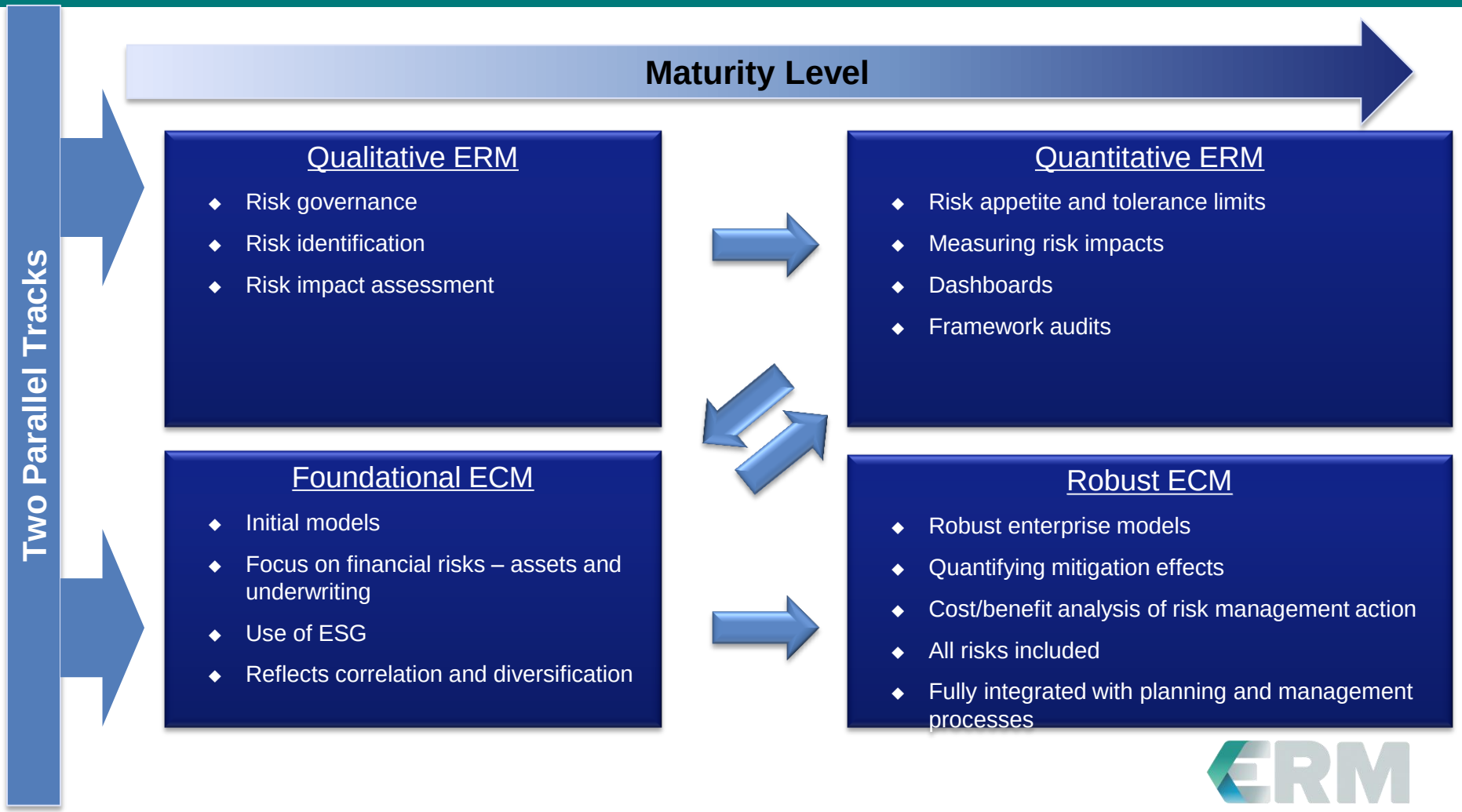
Source: ADVISE® model

ERM/ECM – Framework and Interactions



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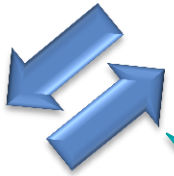
ERM/ECM – Framework and Interactions

Quantitative ERM

- Risk appetite and tolerance limits
- Measuring risk impacts
- Dashboards
- Framework audits



Foundational ECM

- Initial models
- Focus on financial risks – assets and underwriting
- Use of ESG
- Reflects correlation and diversification

- These interactions are iterative
- ERM and ECM "learn from" the other over time
- It will vary from company to company as to which comes first

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UnitedHealth Group Incorporated

Health care coverage and benefits businesses

- Employer & Individual
- Medicare & Retirement
- Community & State
- UnitedHealthcare Global

Helping people live healthier lives

Information and technology-enabled health services

- OptumInsight
- OptumHealth
- OptumRx

Helping to make the health care system work better for everyone

Risk Assessment

Financial Plan

	Actual	Y1	Y2
Members	xxx,xxx	xxx,xxx	xxx,xxx
Revenue	xx,xxx	xx,xxx	xx,xxx
Medical Claims	x,xxx	x,xxx	x,xxx
Operating Expenses	x,xxx	x,xxx	x,xxx
Operating Income	x,xxx	x,xxx	x,xxx

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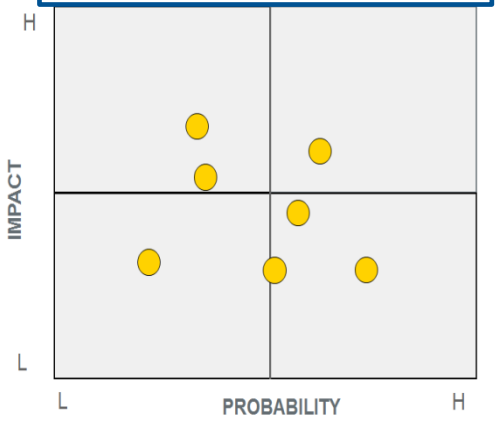
ERM Process



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Economic Scenario Generator

Risk Assessment

Financial Plan

	Actual	Y1	Y2
Members	xxx,xxx	xxx,xxx	xxx,xxx
Revenue	xx,xxx	xx,xxx	xx,xxx
Medical Claims	x,xxx	x,xxx	x,xxx
Operating Expenses	x,xxx	x,xxx	x,xxx
Operating Income	x,xxx	x,xxx	x,xxx

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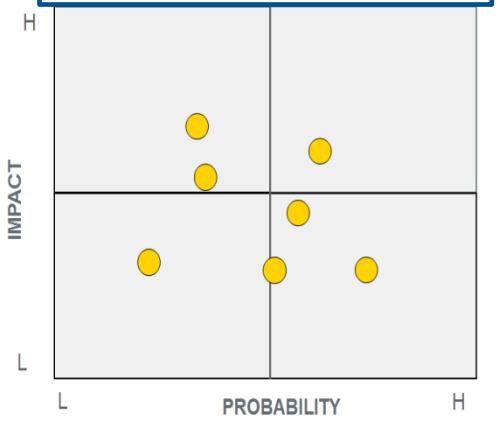
ERM Process



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Economic Scenario Generator

Risk Quantification

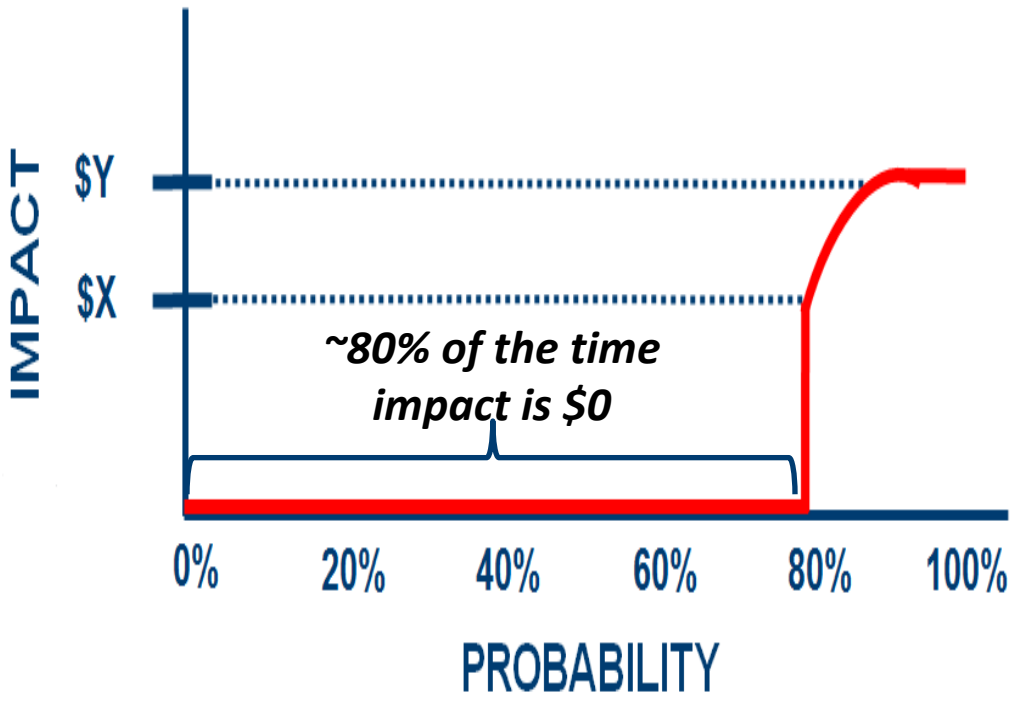
FP&A Process

DETAILED STOCHASTIC

ERM Process

SIMPLE STOCHASTIC

Parameterizing ERM Process Qualitative Risks



Input (Probability)	Output (Impact)
0.0000	$0
0.7999	$0
0.8000	$X
⋮	⋮
1.0000	$Y

Parameterization Based on Management Insights & Judgment from ERM Workshops

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Risk Assessment

Financial Plan

	Actual	Y1	Y2
Members	xxx,xxx	xxx,xxx	xxx,xxx
Revenue	xx,xxx	xx,xxx	xx,xxx
Medical Claims	x,xxx	x,xxx	x,xxx
Operating Expenses	x,xxx	x,xxx	x,xxx
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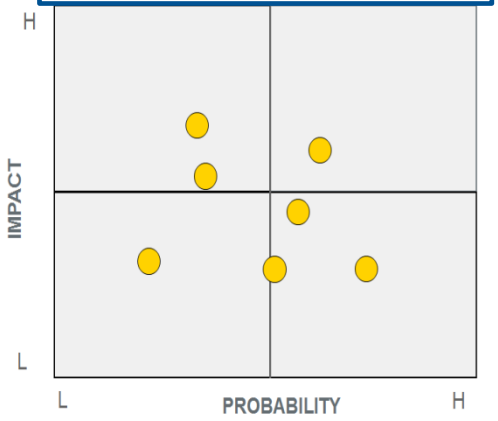
ERM Process



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Economic Scenario Generator

Risk Quantification

FP&A Process

DETAILED STOCHASTIC

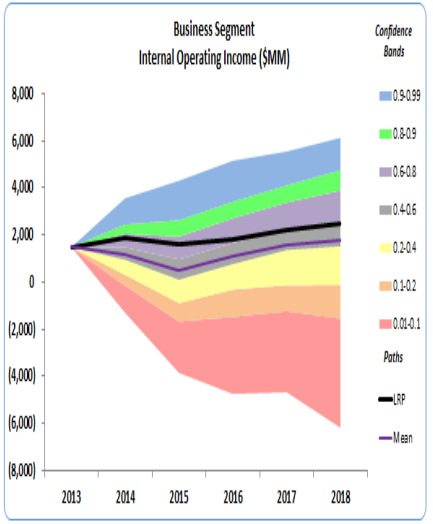
ERM Process

SIMPLE STOCHASTIC

Economic Capital

Multi-Year Stochastic

- Income Statement
- Balance Sheet
- Cash Flow



- Business Specific Risk Drivers
- Probability Based Range of Outcomes

Thank You!

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