

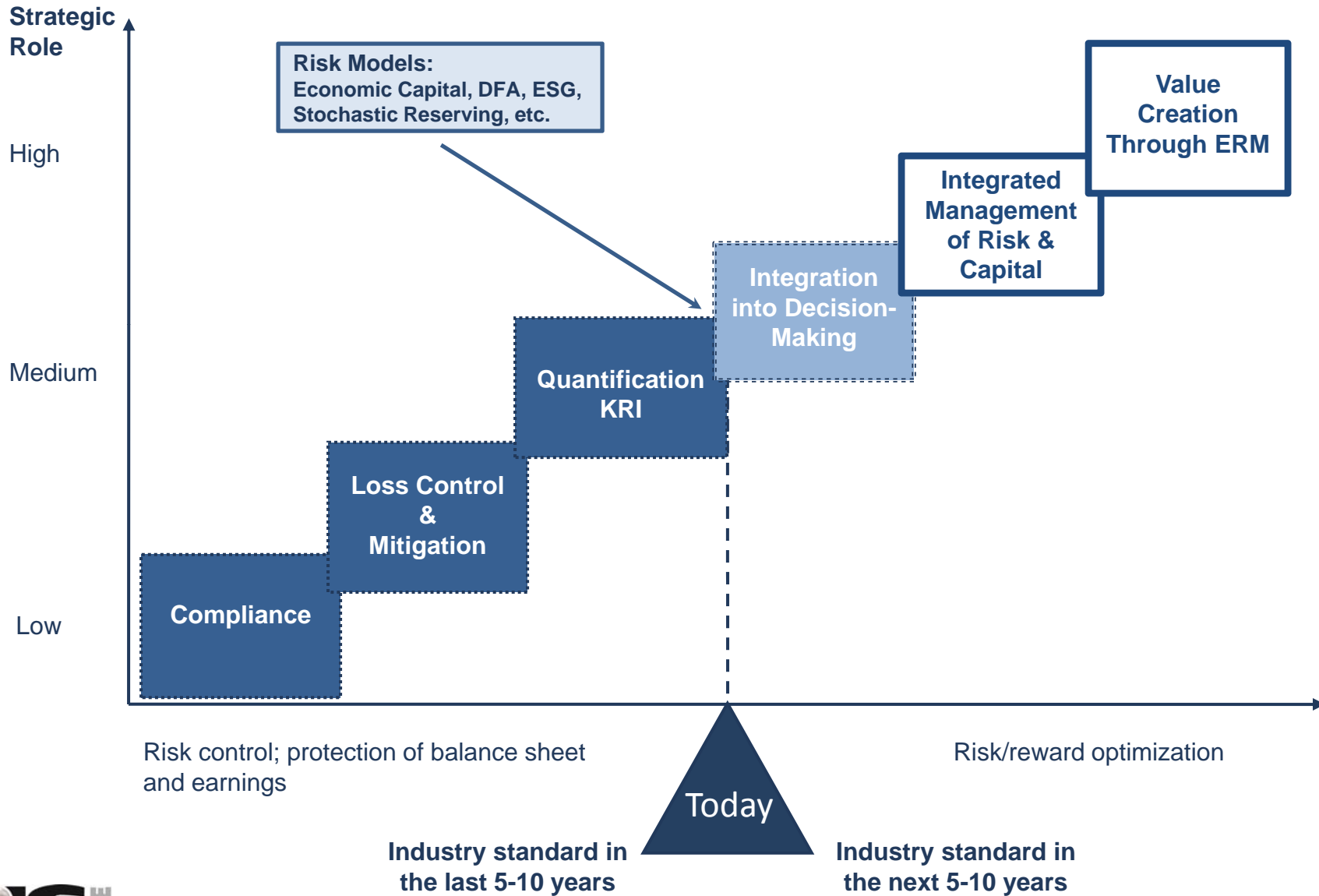
THE UPSIDE OF ENTERPRISE RISK MANAGEMENT (ERM)

From Value Protection to Value Creation



“STAIRWAY TO HEAVEN”

Risk Measurement and Analytics Play Pivotal Role in ERM Evolution

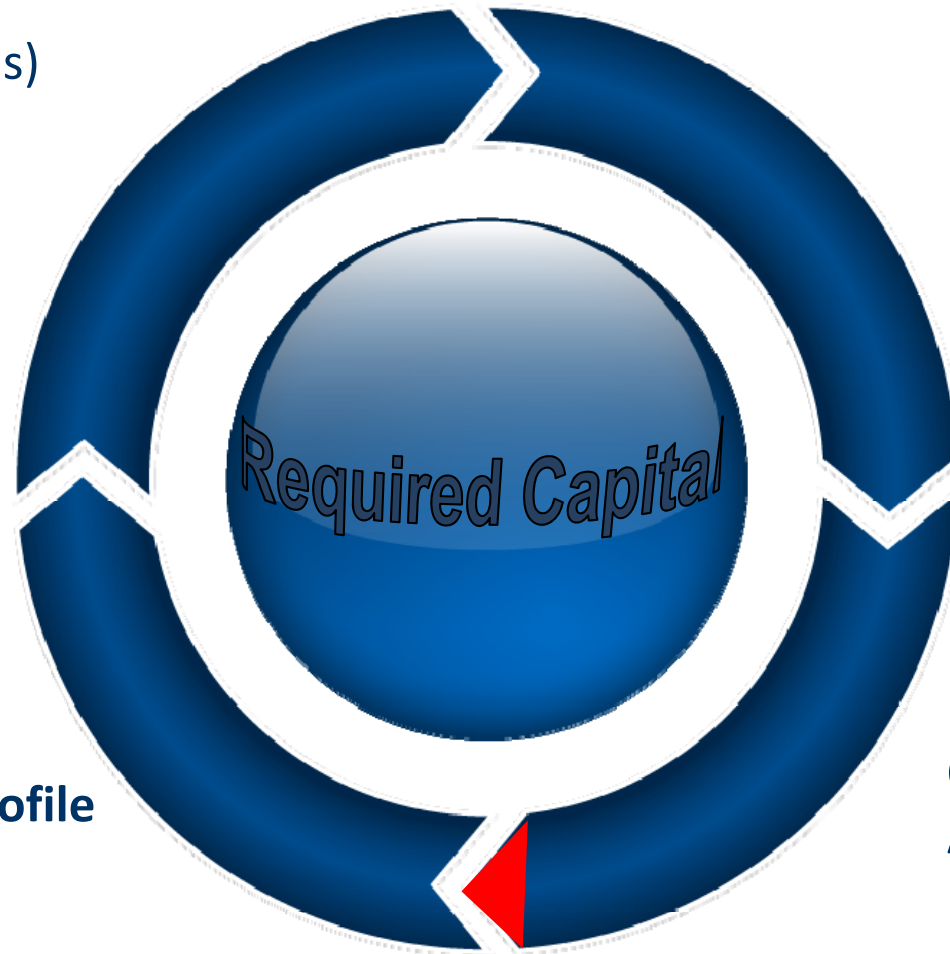


EVOLUTION OF ENTERPRISE RISK MANAGEMENT

ERM as Decision-Making Framework

Risk Tolerance(s)

Risk Limits
(& other controls)



Quantification and
Aggregation

Desired Risk Profile

Risk-Vs.-Reward

Regulators and Rating Agencies Agree on Importance of ERM

ORSA (Solvency II, NAIC SMI) and SCR:

- **ORSA as an internal tool:**
 - Requires (re)insurance enterprises to adequately assess their own short- and long-term risks
 - “Own funds” necessary to cover the identified risks and uncertainties
 - Methodology used to determine solvency needs
- **ORSA as a tool for the supervisory authorities:**
 - Enables the regulators to evaluate the insurer’s risk profile, risk management practices, and approach to capital management
- **Internal capital models to complement standard SCR**

Risk Mgmt / ERM Review (Rating Agencies)

- **Higher-rated insurers are expected to have better risk mgmt and stronger capital**
 - ERM is the link between risk-taking and capital
 - (S&P) Internal capital modeling to supplement RBC

Can an External Observer Evaluate the Strength of ERM?

S&P has been reasonably successful in “rating” insurers’ ERM:

- Risk governance and culture, including the Board’s oversight, ERM organization and committees, risk tolerances/appetite/limits, risk coordination and communication (reporting and dashboards), and risk objectives in incentive compensation.
- Risk controls: insurance risks (underwriting, pricing, reserving, risk transfer), investment risks, asset-liability management, liquidity management, counterparty/credit and operational risks.
- Risk aggregation, concentrations and contagions.
- Risk analytics/modeling.
- Emerging-risk management.
- Strategic risk management (SRM): The insurer’s framework for value creation through controlled risk-taking; balancing short- and long-term objectives; integrated management of risk and capital; capital allocation under the economic, rating-agency and regulatory constraints.

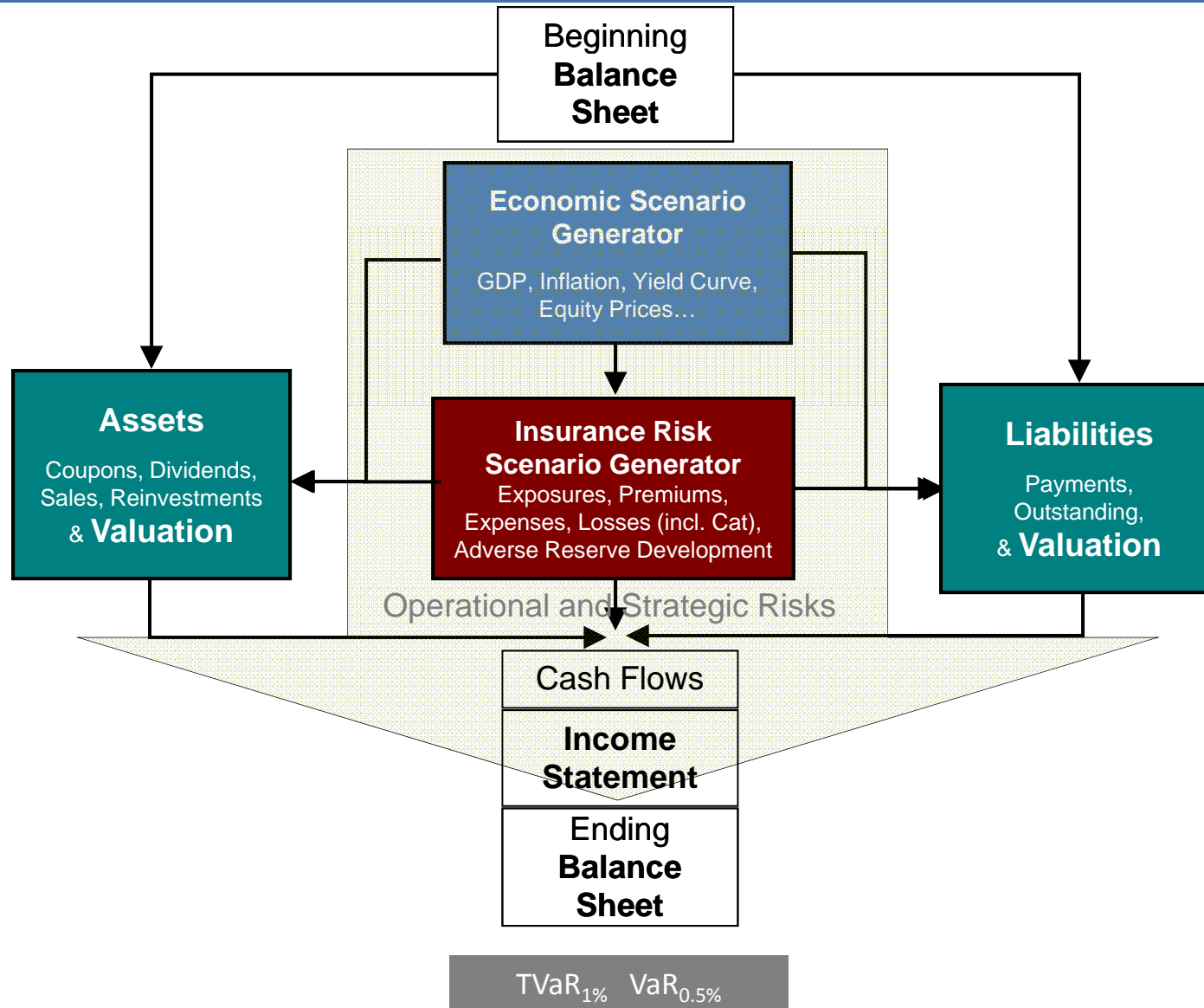
Strategic Risk Management



STRONG SRM IS A DISTINCTIVE FEATURE OF LEADING ERM PRACTICES

FROM REGULATORY TO RATING-AGENCY TO ECONOMIC CAPITAL

DFA as a Platform for Economic Capital Analyses



Economic Scenario Generator (ESG)

In evaluating the health of the future balance sheet, DFA “marks to model” all assets and liabilities relative to the future macro-economic environment simulated by an ESG (particularly, under the yield curve in each simulated scenario). This common environment naturally “correlates” the projected economic valuations of the assets and liabilities. This is particularly important for longer-tailed (e.g. Casualty) businesses, as both their assets and liabilities tend to be especially sensitive to these macro-economic variables.

- Actuaries tend to pay less attention to market and asset risks
- Important issues to consider:
 - Parameterization, testing and validation;
 - Alignment of projected macroeconomic scenarios with the management’s own views (the “use test”);
 - ESG-based portfolio analytics and investment decision-making;
 - “Holy Grail”: Stochastic multi-line, multi-year underwriting-cycle and claim-cost inflation model.

Internal Models Vs. Regulatory and Rating-Agency Models

Internal Capital Models (DFA)

Integrated, fully stochastic model.

All plausible risks can be explicitly incorporated to determine the targeted amount of capital that would assure ongoing solvency.

Explicit modeling of key risk interdependencies; coupled with correlations or copulas. Extreme events and systemic dislocations reduce the benefit of diversification.

The amount of current assets sufficient (relative to the desired rating) to assure ongoing solvency over a one-year period under the aggregate impact of all stochastically generated scenarios.

vs.

S&P Capital Model

Factor-based approach; factors are stochastically calibrated.

Target capital – as affected by market, credit, operational, underwriting and catastrophic risk.

Credit for diversification recognized for correlations in the tail, but at a lower value than observed in the industry (e.g. 50% haircut).

Present value of the expected economic losses in surplus measured over the expected duration of the assets and liabilities and observed over a one-year period for the stress scenario corresponding to the desired rating.

ECM AND STRATEGIC DECISION-MAKING

Economic Capital (EC)

EC = (minimum) capital sufficient – to a pre-defined security standard – to withstand adverse outcomes associated with various risks of an enterprise. (a.k.a. “Risk Capital”)

- EC is a capital-at-risk indicator and a capital-adequacy constraint
 - Highly sensitive to the selected metric (e.g. one-year $\text{VaR}_{99.92\%}$; other metrics are also popular, e.g. $\text{TVaR}_{99.92\%}$)
 - Highly prone to model risk (since it is based on modeling rare/extreme events)
 - Means different things to different people
 - It is usually based on a **one-year** solvency target, and thus only partially reflects long-term creation of value (e.g. from strategic decisions)
 - Tends to disregard mgmt actions, such as capital mgmt, changing reinsurance strategy, changing investment allocations, etc.
- Stop treating EC as the ultimate truth! It is not an objective function (target to achieve). It’s just a capital-adequacy constraint!
 - Even as a constraint, VaR-based EC is insufficient. Additional constraints may be needed to help contain the loss given insolvency (the risk to policyholders)
 - E.g. in addition to imposing a constraint on the probability of insolvency, a model may also seek to constrain the average loss given insolvency.

Internal Models: Tactical or Strategic?



Speaker

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