TOWERS PERRIN
TILLINGHAST

The Katie School

Enterprise Risk Management for Insurance Companies:

Identifying, Evaluating, and Mitigating the Risks Facing Insurance Companies

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AGENDA

Today's agenda

- About Towers Perrin
- Defining ERM and value components
- Our ERM Philosophy
- Developing your ERM Strategy/Framework
- Operational Risk
- Economic Capital
- Appendix A: Detailed ERM Framework for ABC Company
- Appendix B: ERM for Insurers – From Compliance to Value
- Appendix C: 2004 Risk and Capital Management Advance
- Appendix D: Economic Capital: A Key on the Fast Track for Risk-based Decisions

About Towers Perrin

Towers Perrin

- Towers Perrin is a global professional services firm that helps organizations around the world optimize performance through effective people, risk and financial management
- The firm provides innovative solutions to client issues in the areas of:
  - Human resource consulting and administration services
  - Risk and capital management consulting
  - Management and actuarial consulting to the financial services industry
  - Reinsurance intermediary services
- The firm has served large organizations in both the private and public sectors for 70 years
- We are a $1 billion global management consulting firm with over 6,000 employees in 24 countries
- Our clients include three-quarters of the world's 500 largest companies and three-quarters of the Fortune 1000 U.S. companies

ABOUT TOWERS PERRIN

Enterprise Risk Management Practice draws resources from our three businesses: HR Services, Reinsurance and Tillinghast

Enterprise Risk Management Practice



HR Services

The HR Services business of Towers Perrin provides global human resource consulting and administration services that help organizations effectively manage their investment in people. We offer our clients consulting and related administration services in areas such as employee benefits, compensation, communication, change management, employee research and the delivery of HR services.

Reinsurance

The Reinsurance business of Towers Perrin provides global reinsurance intermediary services and consulting expertise that focus on the creative blending of traditional and nontraditional risk transfer vehicles. We help our clients with reinsurance strategy and program review; claims management and program administration; catastrophe exposure management; contract negotiation and placement; and market security issues.

Tillinghast

The Tillinghast business of Towers Perrin provides global actuarial and management consulting to insurance and financial services companies and advises other organizations on risk and capital management. We help our clients with issues related to enterprise risk management; risk financing and self-insurance; mergers, acquisitions and restructuring financial reporting and performance management; and products, markets and distribution.

Defining ERM and Value Components

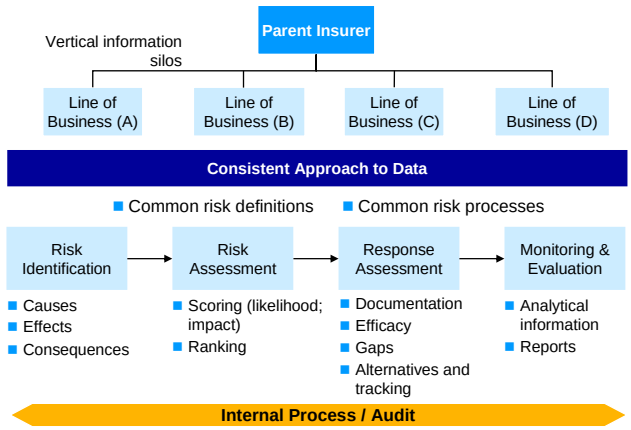
DEFINING ERM AND VALUE COMPONENTS

A Consistent Approach to Data Drives ERM

Information Roll-up, Drill-down, and Query

Management reports are a function of the data

- Risks and controls can by sorted by any classification
  - by division, business unit, and/or corporate
  - by causes, events, and consequences
  - by internal vs. external to the firm
  - by corrective actions to weak controls
  - …
  - …



A consistent approach to data — including common risk definitions and risk processes — is required to implement ERM

DEFINING ERM AND VALUE COMPONENTS

Basic Framework and Implementation Considerations

Data

- Risk control self-assessments
- Checklists/control guides
- Surveys/questionnaires
- Discussion threads
- Online meetings
- Workshops
- Threat scenarios

Analytics

- Knowledge repository
- Business process mapping
- Workflow mapping
- Inference diagrams/event trees
- Taxonomy
- Scoring and ranking
- Benchmarking
- Gap and alternatives analysis
- Activity tracking
- Audit testing and validation

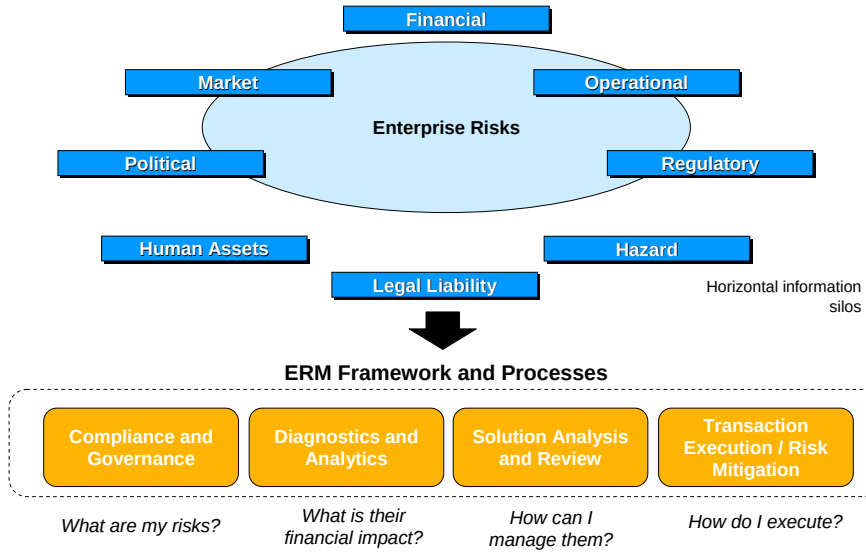
Reports

- Likelihood of achieving objective
- Emerging opportunities
- Control documentation/ SarbOx 404
- Risk and controls profile
- Risk map (gross; residual)
- Key issues and reportable conditions
- Control weaknesses and corrective actions

The ERM framework analyzes organizational and process issues. ERM implementation requires expertise in collecting data, applying tools, and structuring reports

DEFINING ERM AND VALUE COMPONENTS

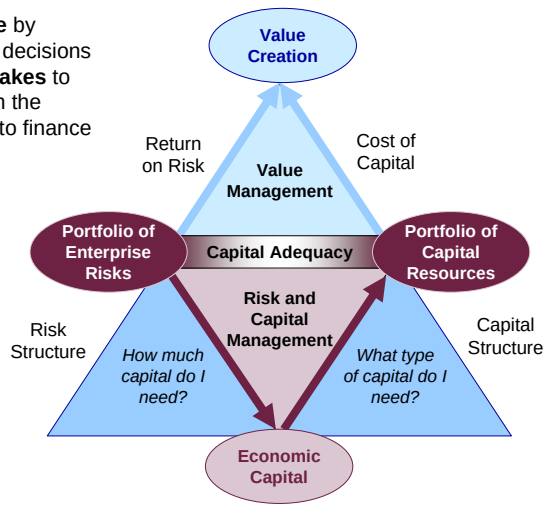
Four Phases of ERM



DEFINING ERM AND VALUE COMPONENTS

Tillinghast's Risk-Capital-Value Framework

Maximize value by relating a firm's decisions on the **risks it takes** to the decisions on the **capital it uses** to finance its business



Towers Perrin's ERM Philosophy

OUR ERM PHILOSOPHY

Our philosophy views ERM as a means to add value to an organization

1. ERM is focused on risks to strategic objectives

- ERM focuses on the risks inherent in the strategy and the risks to successfully execute the strategy
- ERM provides a disciplined approach to identifying, assessing and mitigating strategic risks

2. ERM generates economic value

- Value is created by reducing the cost of capital and by increasing profits through better risk-based decision making
- Value is also created by reducing the volatility of earnings

3. ERM is focused on managing risks in an integrated manner, as a portfolio of risks

- ERM analyzes risks in combination to reveal systemic risks and interactions
- ERM explicitly considers the interrelationships and correlations between risks

Continued…

OUR ERM PHILOSOPHY

Our philosophy views ERM as a means to add value to an organization

4. ERM considers both "downside" risks and "upside" opportunities

- The objective of ERM is to optimize the risk/return profile of the enterprise, not to eliminate risk
- The "riskiness" of certain strategies should be weighed against expected returns

5. ERM is best operationalized by making it part of the normal business process

- It should tie into corporate planning and the allocation of capital and resources
- It should be fully integrated into the mainstream of business decision-making

Developing Your ERM Strategy/Framework

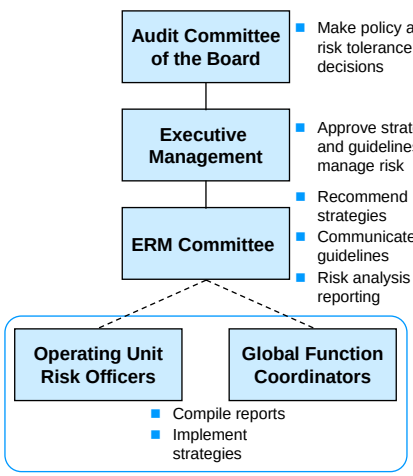
ERM Defies a "One-size Fits All" Solution

The Need for a Strategy

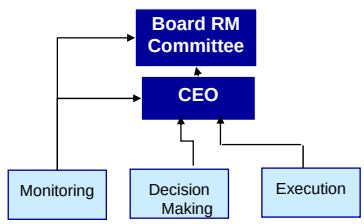
- Explains how ERM is different from existing risk management activities
- Provides focus for developing a common understanding of ERM and achieving buy-in among key stakeholders
- Produces a broadly accepted basis for developing the ERM organizational framework and processes

Companies are positioned differently, based on their culture, organization and management style, to pursue ERM			
Overall objectives	Defensive	↔	Opportunistic
Audience	External stakeholders	↔	Internal management
Risks	Operational	↔	Operational & Financial
Businesses	Corporate / some BUs	↔	All Businesses
Risk Management Process	Identification & Assessment	↔	Risk Mitigation

Balance ERM Objectives Against Management and Cultural Constraints



- Separate risk assessment and monitoring from "risk taking" functions
  - Need an independent authority, working with business units, to assess and monitor risks
  - Board monitors risk, CEO owns risk



- Need a centrally organized unit to "see" across the enterprise to analyze risk interactions and to optimize allocation of expenditures/capital to risks

Guidelines for Risk Assessment

Risk Assessment Considerations

- Don't need to quantify all risks
- When quantifying risks, use a structural model (rather than a statistical model) to understand underlying cause-effect relationships
- Risk assessment process and tools should allow management to perform "what if" analysis on impact of alternative risk mitigation strategies
- Risk assessment methodology should capture the range of unanticipated results

Tactical Risks	Strategic Risks
■ Known environment ■ Capabilities and resources on hand to address ■ Low financial impact ■ Requires little or no investment to address risk	■ Unknown environment ■ Not well understood ■ Not well equipped to address ■ Significant financial impact ■ Significant investment needed to address risk
↓	↓
■ Assign to appropriate management level ■ Business as usual	■ Quantify financial impact ■ Optimize capital budgeting to manage risks

Risk assessment methodology needs to support decision-making

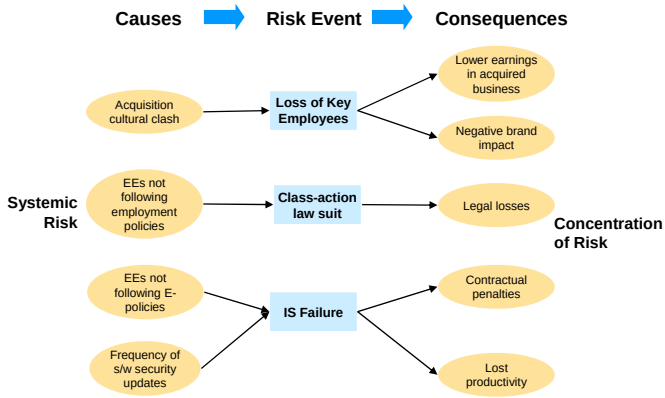
Risk Assessment Identifies the Key Strategic Risks to the Enterprise

	Risk Process
What are my risks?	Risk identification
Which ones are the biggest threats to the organization?	Qualitative risk scoring and prioritization
How do I measure and quantify them?	Risk quantification and modeling
What do I do about them?	Risk treatment
How do I communicate and monitor these risks?	Risk monitoring and reporting

"The Anatomy of Risk": An Illustration

Benefits of Recognizing the Anatomy of Risk:

- Identifies interactions among causal factors and consequences across risks
- Illustrates interactions among causal factors and consequences across risks to identify systemic risks and risk concentration
- Avoids double or triple counting of risks that can result from coding the same cause-effect chain as separate risks
- Provides greater clarity of causes, effects and impact, thereby giving reliability in assessing potential losses
- Mitigation plans and controls can be developed using cause-effect relationships



The "Anatomy of Risk" provides a flexible classification system that captures the many attributes of risk

Example of Risk Prioritization questionnaire used for multi-line company

Mark "***X***" if ***Yes***

Leave ***blank*** if ***No***

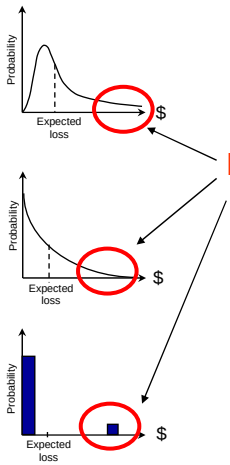
Mark "***?***" if not qualified to answer

	I am concerned that…	**FREQUENCY** I believe that this risk factor has a high likelihood of occurrence over the next two years.	**SEVERITY** Assuming this event does occur, I believe it would have a sufficient impact on financial results to materially affect share value (i.e., 10% or greater drop in share price).
	Financial - Credit/Counterparty		
1	…credit events from sale or write-down of distressed securities could cause earnings loss/ reduced capital		
2	…our estimates of reinsurance availability/recoverable collectibility could be overstated, causing capital drain		
3	…counterparty risk could exist with respect to derivative instruments		
	Financial - Pricing & Product Design		
4	…expense overages, from lack of scale or inefficiency, could reduce product profitability	x	
5	…market driven aggressive pricing could reduce product profitability	x	
6	…poor underwriting practices could negatively affect product profitability	x	
7	…death claim volatility could adversely affect AF earnings stability		
8	…terrorist attack losses are not excluded and could reduce AF's life insurance profitability		x
9	…unanticipated surrenders could cause DAC amortization acceleration, increasing expenses & reducing profitability	x	
10	…updating underlying AF gross profit assumptions to reflect actual experience could result in material cumulative DAC amortization adjustments	x	

DEVELOPING YOUR ERM FRAMEWORK/STRATEGY

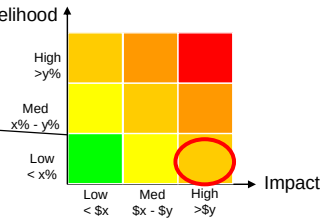
Assessment Methodology Should Reflect the True Nature of Risks

This is what risks look like..



Risks

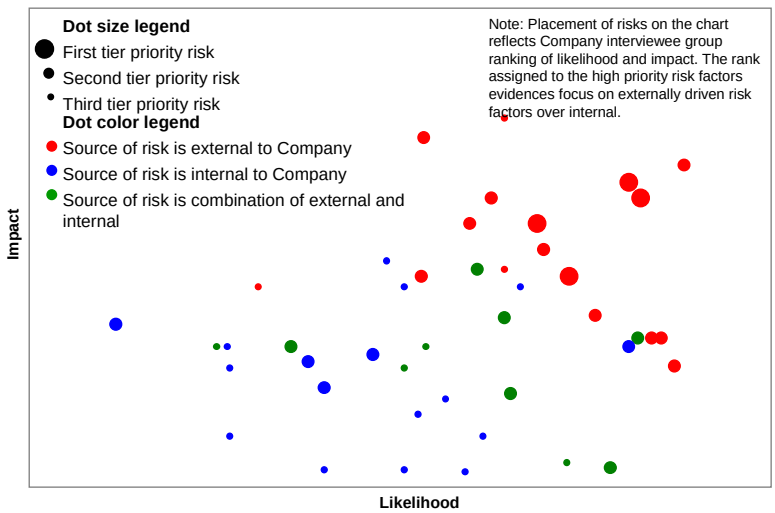
...but the traditional method of assessing risks distorts the picture



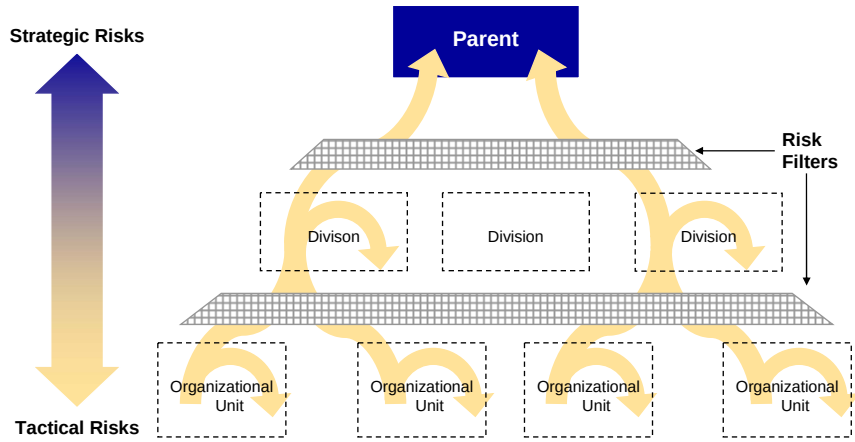
- Simplifies distribution of loss scenarios into a single scenario — which scenario?
- Underemphasizes real risks: low likelihood of large losses
- Likelihood x Impact represents expected loss — not risk

DEVELOPING YOUR ERM FRAMEWORK/STRATEGY

Illustration: Final Likelihood and Impact Results



Triage Strategic vs. Tactical Risks



The "Risk Triage" process filters strategic risks from tactical risks

Guidelines — Risk Mitigation

- Alternatives for mitigating strategic risks should be compared on a common financial basis that reflects costs and benefits
- The benefits of risk mitigation should reflect difference in preferences of shareholders vs. bondholders
  - Shareholders are concerned about meeting target returns commensurate with the riskiness of the stock
    - — Volatility of earnings, probability of not achieving target returns
  - Bondholders are concerned with likelihood of default
    - — Bond yield spreads or ratings
- The method of estimating costs of risk mitigation activities depends on type of activity
  - Avoidance by not engaging in risk generating activities — opportunity cost
  - Reduction through changes in business processes — expense
  - Financing using on-balance sheet capital — cost of capital
  - Financing using off-balance sheet capital — cost of "rented" capital
- An economic model should be used to optimize the combination of risk mitigation strategies that maximize value

Guidelines — Risk Monitoring and Reporting

- Frequency of assessing risk exposure should reflect volatility in underlying risk factors
  - Market risks, such as commodity prices and foreign exchange rates, may need to be assessed daily
  - Operational risks, such as technology, may require quarterly assessment
  - Business risk, such as competitor or regulatory, may require only annual assessment
- Distinguish between monitoring needs for ongoing decision-making and for management/Board oversight
- Design hierarchical reporting format to provide feedback to management at all levels

Guidelines — Risk Organization

- Separate risk assessment and monitoring from “risk taking” functions
  - Need an independent authority, working in partnership with business units, to assess and monitor risks
- Why have a separate ERM function?
  - Cause-effect risk dynamics span organizational boundaries
  - Need a centrally organized unit to “see” across the enterprise to:
    - — Analyze risk interactions
    - — Optimize allocation of expenditure/capital to risks

Operational Risk

Key issues

For operational risks, companies need to be able to:

- Demonstrate that they have a robust risk management framework embedded in the business
- Identify the “right” risks to hold capital against
- Demonstrate an appropriate quantification methodology has been used
- Demonstrate an appropriate amount of capital is held
- Prove assumptions about control effectiveness are reasonable
- Show that they are using the analysis to manage risk exposures

The areas that need to be addressed are exactly the same for operational and financial risks

Operational risk practices

Risk management:

- Development of operational risk management frameworks - *principles based approach*
- Review of operational risk frameworks – *"best practice" review criteria*

Risk measurement:

- Risk "maps" – *risk identification tools*
- Bottom-up stress testing methodology – *simple and robust approach*
- Actuarial models – *frequency / severity models*

Risk management and measurement:

- Bottom-up process models – *advanced holistic techniques, including Anatomy of Risk*

Overview: Bottom-up stress testing

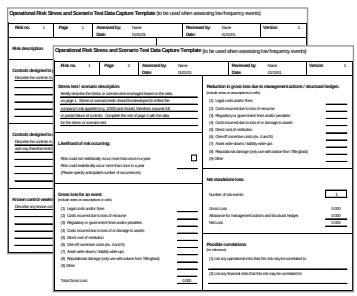
A standard approach:

- Risk identification interviews
  - *Too many risks 1,000 v. 50**
- Completeness check
  - *Confusion on scope**
- Discussion of material risks with management
- Stress test development workshops
  - *Getting a number for remote risks**
- Consideration of risk mitigants
- Calculation of required capital
  - *Over complexity**
  - *Poor documentation**

** some of the issues that clients struggle with*

Key features:

- Robust (compliant) methodology
- Data capture
- Review and validation (us and them)
- Documentation of analysis and process


Operational Risk Stress and Scenario Test Data Capture Template (to be used when assessing low frequency events)

Risk description:

Operational Risk Stress and Scenario Test Data Capture Template (to be used when assessing low frequency events)

Risk no. 1 | Page 1 | Assessed by: Name Date: 01/01/03 | Reviewed by: Name Date: 01/01/03 | Version 1

Controls designed to:

Risk no. 1 | Page 2 | Assessed by: Name Date: 01/01/03 | Reviewed by: Name Date: 01/01/03 | Version 1

Stress test / scenario description:

Likelihood of risk occurring:

Risk could not realistically occur more than once in a year

Risk could realistically occur more than once in a year

(Please specify anticipated number of occurrences)

Gross loss for an event:

(include notes on assumptions in units)

(1) Legal costs and/or fines

(2) Costs incurred due to loss of or damage to assets

(3) Direct cost of restitution

(4) One-off corrective costs (ex. it and h)

(5) Asset write-downs / liability write-ups

(6) Reputational damage (only use with advice from "Wingfield)

(9) Other

Total Gross Loss:

Reduction in gross loss due to management actions / structured hedges:

(include notes on assumptions in units)

(1) Legal costs and/or fines

(2) Costs incurred due to loss of or recourse

(3) Regulatory or government fines and/or penalties

(4) Direct cost of restitution

(5) One-off corrective costs (ex. it and h)

(7) Asset write-downs / liability write-ups

(8) Reputational damage (only use with advice from "Wingfield)

(9) Other

Net standalone loss:

Number of risk events: 1

Gross Loss: 0.000

Allowance for management actions and structured hedges: -0.000

Net Loss: 0.000

Possible correlations:

(for reference)

(1) Lost any operational risks that this risk may be correlated to:

(2) Lost any financial risks that this risk may be correlated to:

Overview: Bottom-up process models

Risk measurement:

- Understanding likely failure rates
- Calculating required operational risk capital

- Core risk measurement outputs include:
  - Frequency of failure
  - Required economic capital
  - Sensitivity analysis

Risk management:

- Testing long-term process stability
- Testing the effectiveness of specific controls
- Identifying key risk indicators
- Running stress tests and assessing mitigation strategies

- The model can also be used to:
  - Test the effectiveness of controls
  - Identify Key Risk Indicators
  - Run realistic stress tests (e.g. the impact of growth, or reputational damage)
  - Develop risk mitigation strategies
- In addition, the model can test the long-term stability of a process

Economic Capital

ECONOMIC CAPITAL

There Are a Variety of Recent Developments Encouraging the Use of EC

- Basel II
- Solvency II / European CRO Forum
- OSFI regulation for segregated funds (CAN)
- C-3 Phase II: RBC for variable annuities (VA) – US
- Proposed stochastic reserves for VAs and UL products – US
- GAAP SOP 03-1: explicit reserves for guarantees – US
- General need to develop risk profiles and perform hedging analysis
- Measuring Economic Value / Market Consistent Embedded Value (MCEV)
- Measuring exposure to catastrophic events
- Demands and increasing scrutiny by rating agencies / regulators

Calculating EC is becoming an important tool for insurers in guiding risk-based decision making

ECONOMIC CAPITAL

Definitions of economic capital: "Best estimate" liability approach

Economic Capital is

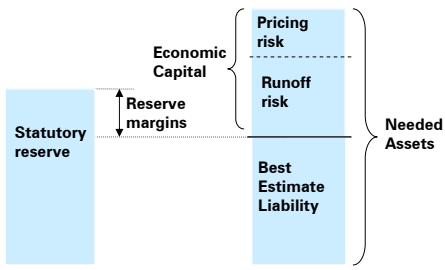
- The level of assets, in addition to the Best Estimate Liability, required to pay future policyholder benefits at the chosen Security Factor
- Economic Capital covers the volatility in:
  - The runoff of existing business
  - The future business ("pricing risk")

Best Estimate Liability is

- The best estimate projection of non-investment cash-flows,
- Discounted at the asset returns under the best estimate economic scenario

Security Factor is

- Based on a risk of ruin factor consistent with the company's financial strength rating

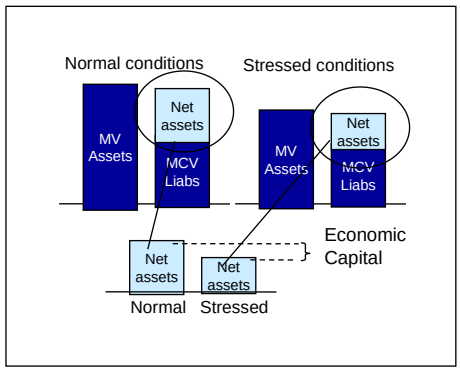


ECONOMIC CAPITAL

Definitions of economic capital: Market-consistent balance sheet approach

Economic capital is

- Measured as the difference in "market consistent net assets" between normal conditions and stressed conditions
  - The stress tests applied are each calibrated to a probability level over a one year time horizon, consistent with the company's financial strength rating
- Separate stress tests to cover a variety of market, credit and insurance risks occurring over the projected time horizon
- Results are aggregated using a correlation matrix approach



ECONOMIC CAPITAL

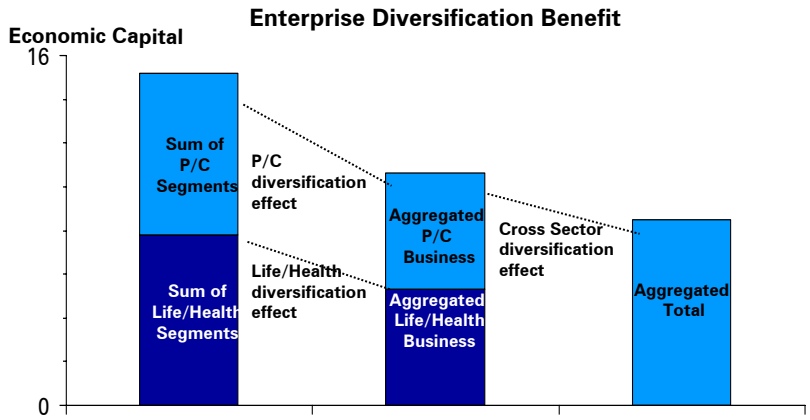
There is no "right" or "wrong" approach to building an economic capital model . . .

Decision 1: Period for assessment	Decision 2: Definition of capital	Decision 3: Measure of risk	Decision 4: Risks to include	Decision 5: Quantification methodology	Decision 6: Aggregation
One year	Statutory	Risk of ruin	Market	Stochastic modelling	Additive
n years	GAAP	VaR	Credit	Stress Testing	Variance / Covariance
Run off of portfolio	Economic	TVAR or CTE	Insurance	Factor based	Stochastic
			Operational		
			Liquidity		

Six key decisions need to be made and the approach taken should reflect the nature of the company and management's objectives

ECONOMIC CAPITAL

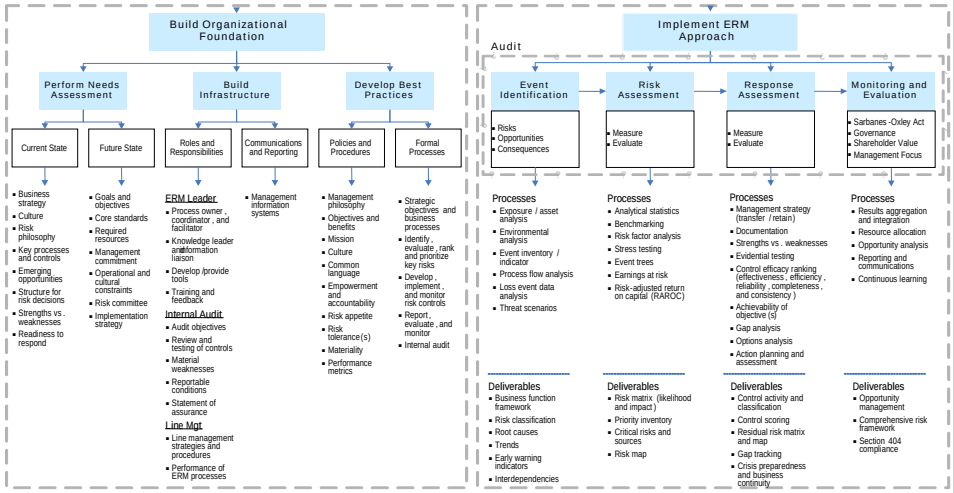
Case Study: measuring diversification benefits by combining multiple lines of business



- The diversification benefit incorporated into economic capital is often developed by combining multiple lines of business into an aggregated total

Appendix A: Detailed ERM Framework for ABC Company

Detailed ERM Framework for ABC Company



Appendix B: ERM for Insurers – From Compliance to Value

RISK MANAGEMENT

ERM FOR INSURERS — FROM COMPLIANCE TO VALUE

Adding a corporate finance dimension to actuarial analysis of risk creates a unifying framework that shows how enterprise risk management (ERM) can create value.

By Prakash A. Shimpi and Stephen P. Lowe

Risk and capital management are important, fundamental concerns of the insurance industry. To address these concerns, insurers have always assessed risks, allocated capital to them and developed increasingly sophisticated methods for risk management at a level of granularity not always available to other businesses. Many insurance companies now recognize the critical importance of integrating risk management with capital management. Doing this is easier said than done — and requires careful thought to make sure both tasks are handled in a manner consistent with value creation.

Now there is a growing demand from shareholders and others for senior management to take enterprise risk management (ERM) more seriously. This means formalizing the essential connection between a company's business operations and its overall risk management program. This is ending the practice of operating these functions as silos within many organizations.

The initial stage of ERM is mostly about compliance and corporate governance. New rules and responsibilities have been imposed on senior management and boards of directors, resulting in higher costs, resource constraints and even questions about whether these new regulations are really cost effective.

However, leading companies are beginning to use ERM as a strategic tool that will help them increase shareholder value. To do so requires a synthesis of the actuarial techniques of insurance and the capital markets perspectives of corporate finance. Strategic ERM requires a unifying framework that articulates risks consistently across an organization and evaluates alternative capital structures — comprising equity, debt, insurance and hedging — to bear those risks.

THE EVOLUTION OF ERM

Both life and non-life insurers have contributed to the evolution of ERM techniques, reflecting the event risks that they face. For life insurers, the mortality event is a question of "when" and not "if," so they have focused intently on whether the firm has sufficient assets to meet the obligations of each policyholder at the right time. Given the long-term nature of life contracts and a focus on asset-intensive products such as annuities, life insurers have been early developers of managing financial and investment risks.

In the 1950s, the actuaries developed a formal asset/liability management (ALM) method for assessing and managing interest-rate risk. This method, known as immunization, has since become the foundation of several risk management techniques in life insurance, pensions, banking and derivatives.

Prior articles in *Emphasis* magazine have described leading-edge approaches to managing risk and capital at both the tactical and strategic levels.

In 1990/4 "Extending the Efficient Frontier," Joseph Buff and John Sweeney project a standard investment analysis technique to the joint management of an insurer's assets and liabilities.

In 1995/1 "The Once and Future Discipline," Jerry Miccolis predicts the use of strategic risk management within 10 years.

In 1998/3 "Risk Financing the DFA Way," Imelda Powers and Joseph Lebens present a decision-making technique to evaluate alternative capital management solutions.

In 1998/4 "Two Sides of the Same Coin," Stephen Lowe describes how managing risk and deploying capital are interrelated activities, ultimately leading to creation of shareholder value.

In 1999/3 "Risk Managing Shareholder Value," Jane Rastallis and Jerry Miccolis show how good corporate governance and the coordinated management of a full range of risks can increase an insurer's performance.

In 2000/1 "Getting a Handle on Operational Risks," Jerry Miccolis and Samir Shah develop rigorous techniques to model operational risk.

In 2002/3 "It's a Stochastic World After All," Alastair Longley-Cook and Michael O'Connor describe how simplistic methods to determine capital or assess risk are being replaced by more sophisticated stochastic modeling.

In 2000/3, 2002/4 and 2004/4, articles present the findings of periodic ERM surveys of the insurance industry.

Prakash A. Shimpi is a consultant with Towers Perrin in New York, and Practice Leader with global responsibility for Tillinghast's Enterprise Risk Management (ERM) practice. He is considered an innovator in the area of ERM and has expertise in the development of alternative risk transfer products and risk securitization bridging the insurance and capital markets. Mr. Shimpi is a Fellow of the Society of Actuaries and is a CFA charterholder.

Stephen P. Lowe is a principal of Towers Perrin in Hartford, and is Managing Director of Tillinghast's Global Property/Casualty practice. He has expertise in a variety of financial, product and strategic issues, and has worked with clients on risk and capital management issues for most of his career. He is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries.

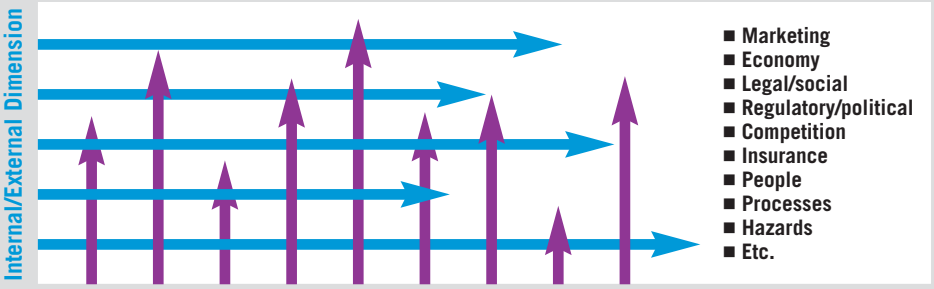
The volatile interest-rate environment of the late 1980s, combined with regulatory action requiring life insurers to demonstrate capital adequacy relative to their liabilities, led to cash flow testing (CFT). This expanded ALM to include simulation of a wider set of risks of the business line and their financial impact over a variety of scenarios and time horizons. As a result, the life insurer's tool kit is now able to address risks arising from options and guarantees embedded in both the products and the assets used to fund them.

The techniques for managing event risks have come primarily from the P/C insurers where the questions about an event are both "if" and "how big." Formally, the analytical tools address the combination of frequency and severity of events, often with the challenge of sparse data. Immunization principles are not much help here, so P/C insurers have developed increasingly sophisticated tools to manage their portfolio of risks and assess the capital they need to run their businesses. The most notable tool is dynamic financial analysis (DFA), developed in the 1990s, which has the same underlying principles of ALM and CFT but addresses a wider range of business risks. In effect, DFA assesses the total capital required to cover the entire mix of event risks in the insurance portfolio.

Insurers have also benefited from risk management techniques developed by banks to assess whether they have sufficient capital to run their business — spurred in part in recent years by the growth in the derivatives markets. For the most part, these financial risks are actively traded with a wealth of data available to validate and calibrate pricing and hedging models. As a consequence, there is greater recognition of the need to evaluate risks on a market-consistent basis and impose arbitrage-free conditions that formalize the basic rule that two identical cash flow streams must have the same price.

EXHIBIT 1

Insurers Need to Manage Risk Arising From Many Interrelated Areas



ERM STAGES	MANAGEMENT ISSUES
1. COMPLIANCE AND GOVERNANCE	*...What are my risks?*
2. DIAGNOSTICS AND ANALYTICS	*...What is their financial impact?*
3. SOLUTION OPTIONS	*...What can we do about them?*
4. EXECUTION	*...How do I take action?*

Although some of the leading insurers have both life and P/C operations, traditionally risk and capital management were managed separately. This has changed dramatically in the last decade. For both single line and composite insurers, detailed analysis of risk dynamics for each business line can be aggregated to develop a firmwide view of risk and the consequent capital requirements, enabling the entire organization to benefit from the diversification of the portfolio of risks underwritten.

A major work in progress for insurers, as well as for other corporations, is a robust way to qualify, quantify and manage operational risk. This, along with new regulations intended to increase transparency, accountability and good corporate governance, has had the effect of formalizing risk management with a more comprehensive scope. Today, leading firms are doing more than complying with new corporate governance regulations. They are using ERM to create value.

COMPLIANCE AND GOVERNANCE

The compliance and governance phase of ERM begins by asking a vital but elementary question of management and the company's board: Do you know your risks? Clearly that must only be the first in a series of questions that lead ultimately to management action (see *Exhibit 1*).

The value of ERM is the ability to optimize the value created from the joint management of risk and capital. As Exhibit 1 shows, a firm is exposed to a variety of risks. The taxonomy of risks is merely a device to capture the descriptions of a firm's risk exposures. Perhaps more important is the diagnosis of the financial impact of those

Essentially, the portfolio of enterprise risks and the portfolio of capital resources are the two major items that management can change to advance the interests of the firm.

risks as they act in concert upon the firm. This forms the basis for developing and assessing a range of solutions and the criteria required to take action to mitigate or capitalize on those risks.

Ultimately, once compliance processes and procedures have been put into place, the firm needs to consider how to finance its risks. However, this is not easy. While the relationship between risk and capital management seems clear enough in principle, how does a firm put the right measures in place that fully capture this linkage?

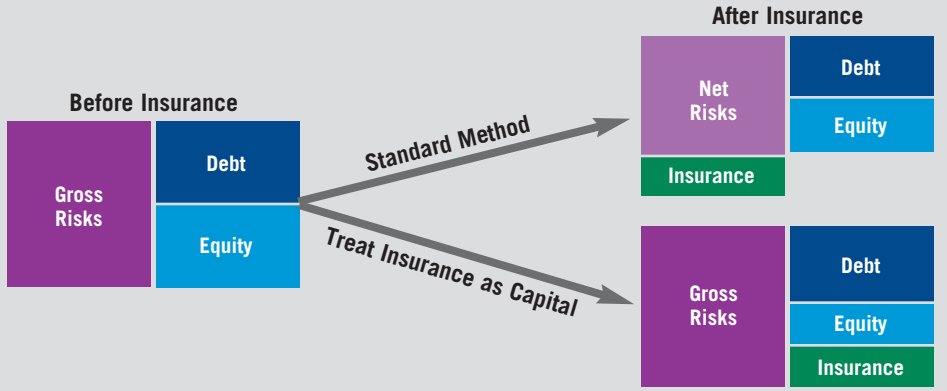
COMPLIANCE TO VALUE CREATION

To move from a compliance focus to a value focus, management needs a unifying framework that is valid for the financial management of the full range of risks that it faces and that can be used at the tactical (product line) or strategic (senior executive) levels. This can be achieved if the framework combines actuarial techniques with the capital market perspectives of corporate finance and explicitly recognizes that risk financing instruments act as equity substitutes.

The actuarial perspective begins with a bottom-up evaluation of each individual risk and then aggregates that information into an overall assessment of the portfolio of risks. The analysis of the portfolio of risks leads to a determination of the amount of capital needed to support those risks.

The corporate finance perspective focuses on the firm's capital structure. Its purpose is to increase shareholder value by delivering the optimal balance sheet — composed of equity and debt — that minimizes the cost of capital not just in absolute terms but relative to the price of risks it bears.

EXHIBIT 2
Treat Insurance as Part of Capital Structure



JOINT PERSPECTIVE — RISK AND CAPITAL

Both actuaries and corporate finance managers know intuitively that risk and capital are related. Their joint perspective leads naturally to the question of how insurance and hedging instruments should be treated in the analysis of risk financing alternatives. There are essentially two possible choices: Treat them as offsets to risk or treat them as capital (see *Exhibit 2*).

Conventionally, capital is defined as only those instruments that provide immediate cash to the firm (e.g., equity and debt) and exclude contingent capital (e.g., insurance and derivatives) that may bring cash to the firm at some later date. The total paid-up capital (debt plus equity) must be sufficient to bear the net risk of the firm after insurance and hedging. The capital structure decision is about financial leverage, which selects the mix of equity and debt.

Alternatively, the definition of capital can be broadened to include all instruments that reduce the need for equity. With this definition, the sum of the paid-up and contingent capital must be sufficient to bear the gross risk of the firm. The capital structure decision combines financial leverage (equity verus debt) and risk leverage (risk retention versus risk transfer) to find the best mix of equity, debt and insurance. It is consistent with the way insurers evaluate their reinsurance programs and make decisions on risk transfer based on the capital relief they can achieve.

STRATEGIC RCV FRAMEWORK

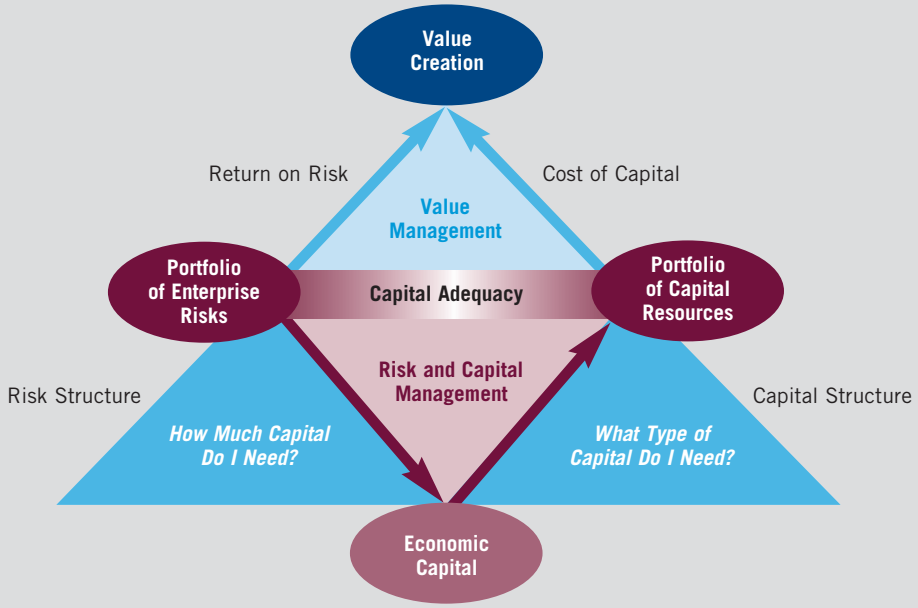
A strategic risk capital value (RCV) framework (see *Exhibit 3*) connects value creation to the fundamental choices that managers make on a daily basis. Essentially, the portfolio of enterprise risks and the portfolio of capital resources are the two major items that management can change to advance the interests of the firm.

Conventionally, risk management and capital management have operated as two different disciplines and, indeed, as two (or more)

EXHIBIT 3

A Strategic RCV Framework

Maximize value by relating the firm's decisions on the risks it takes to the decisions on capital it uses to finance its business.



separate operations within a firm. Nevertheless, the two have always had a close economic relationship. In a corporate setting, this relationship acts like gravity, keeping the two portfolios of enterprise risk and capital resources tightly connected. The amount of risk dictates the capital needed and, vice versa, the amount of capital determines the risk capacity.

The relationship between risk and capital is not easy to articulate. In this framework, this relationship is developed by referring to an intermediate measure, economic capital (EC) which is the amount of capital needed to remain solvent with a high probability. In its purest sense, EC is the true measure of the weight of a firm's risks. (This term distinguishes EC from other measures that are also relevant to the firm, such as regulatory capital, rating agency capital and GAAP capital.)

The risk structure of the firm (i.e., the financial impact of the company's risk exposures as they unfold over time and scenarios) is measured by EC. In practice, this is done by running a dynamic EC model that simulates the financials of the firm over a range of possible futures and produces the minimum amount of capital that the firm needs to bear its risks.

With EC setting the minimum amount of capital needed, the key corporate finance question is: What is the best capital structure for the firm? The same dynamic EC model can help managers evaluate different combinations of capital resources (e.g., equity, preferred stock, debt, insurance, hedging).

The ultimate aim is to create value. The firm is expected to generate returns on the risks inherent in its activities. (Strictly speaking, the shareholders would expect the firm to generate excess returns over the price of those risks in the markets.) Holding capital — both in cash form as well as in contingent form — results in a cost reflecting the price of accessing that capital. Through their selection of risks and capital, management has the opportunity to maximize value creation (shown in the top half of Exhibit 3) bearing in mind the constraints imposed by risk and capital management (shown in the bottom half of Exhibit 3). In short, value is created when the return on risk exceeds the cost of capital.

While the RCV framework may be conceptually elegant, care must be taken in its implementation to be sure that all assumptions are explicit, particularly those regarding market consistency.

BROADER ANALYSIS, BETTER RESULTS

Risk management at the enterprise level, or ERM, is intended to assess, control, exploit, finance and monitor risks from all sources in order to increase shareholder value. It encompasses the actuarial approach to risk. But it also addresses governance questions such as who is responsible for those risks, does the firm have enough capital to sustain itself and how much volatility can the firm tolerate.

Risk and capital management is the foundation of how insurance companies function. Today, with the latest developments in ERM, the insurance industry is taking another evolutionary step that is both beyond, and inclusive of, ALM, CFT and DFA. Using these tools within a unifying framework, managers can include more risks in their planning and arrive at a more comprehensive analysis of their business. While regulatory actions may have provided the initial impetus, the insights gained from this analysis can profoundly affect management's ability to create value.

Comments or questions may be e-mailed to prakash.shimpi@towersperrin.com or stephen.lowe@towersperrin.com.

Appendix C: 2004 Risk and Capital Management Advance

Appendix D: Economic Capital: A Key Tool on the Fast Track for Risk-based Decisions

FINANCIAL SERVICES

2004 RISK AND CAPITAL MANAGEMENT ADVANCE

Global insurers are forging ahead in their pursuit of a far-reaching, strategic approach to managing risk so they can make better business decisions.

By Linda Chase-Jenkins and Ian B. Farr

Risk and capital management practices among global insurers are moving ahead systematically — and in some areas quickly — to make integrated risk and capital management a strong driver of success in every major market and in every line of business. This was a finding in Tillinghast's 2004 survey of global insurers.

Earlier surveys pointed to the promise inherent in taking a strategic approach to the holistic management of risk and capital at the enterprise level. The 2004 survey shows how that promise is being fulfilled — and what steps insurers are taking to complete this work that is still very much in progress, in particular by developing "economic capital" (EC) as an important tool for quantifying risk and making risk-based decisions.

The 2004 survey reveals five major findings regarding risk and capital management among insurers worldwide:

- Insurers are giving enterprise-level risk management increasing attention, high-level accountability and clear responsibilities befitting a legitimate strategic function and discipline.
- Insurers see the principal objectives for enterprise risk management (ERM) as helping them create and improve shareholder value through better risk-based decision making and capital allocation.
- Economic capital is becoming an important tool for insurers in guiding decision making at all levels in their organizations.
- Enhanced risk and capital management approaches have already affected business decisions made by insurers and are likely to do so more frequently as usage increases in a wide variety of areas.
- Despite the progress that insurers have made, risk management techniques and economic capital calculations are still very much works in progress, with the method for calculating economic capital still evolving.

The full 2004 edition of the Tillinghast benchmarking survey, *Adding Value Through Risk and Capital Management — 2004 ERM Survey Update*, will be published and available in January. In this article, we preview its most significant results.

ENTERPRISE-LEVEL RISK MANAGEMENT HAS COME OF AGE

Four specific results from the 2004 survey make the compelling case that risk management is coming of age, gaining the attention, high-level accountability and clear responsibilities that are necessary for a legitimate strategic function and discipline.

First, an overwhelming number of respondents (86%) say that enterprise-level risk management is more of a priority today than it was a year ago.

Second, since our last survey in 2002, there has been a strong shift in the positioning of the risk management function within organizations (see *Exhibit 1*). In 39% of respondents, a Chief Risk Officer (CRO) has been given primary responsibility for risk management, an increase from 19% in 2002, when the CFO more frequently had such responsibility. Additionally, in nearly half the companies, the person responsible for risk management now reports directly to the CEO (see *Exhibit 2*). That includes 40% of CROs who now report to the CEO, up from 26% in 2002.

Third, the number of companies with cross-functional risk management committees has increased from 38% in 2002 to 63% today. Thus more companies have chosen to move away from the risk silo approach in order to improve communication on risk management throughout their organizations. This trend is particularly prevalent in Asia, Canada, and Europe, where 70% or more have set up such committees, while slightly less than half have done so in the U.S.

Fourth, for most risk management processes, insurers have clearly defined and assigned roles and responsibilities for market and insurance risks. On the other hand, for operational risk, these roles and responsibilities are clearly defined only for identification, prioritization, monitoring, and control/mitigation, but not for modeling and measurement.

For example, for risk and identification and prioritization, 86% of respondents have clear roles and responsibilities for insurance risks, 76% for market risks and 72% for operational risk. However, for risk modeling/measurement, the percentages are 89% and 72% for insurance and market risks, but only 30% for operational risk.

Linda Chase-Jenkins is a principal of Towers Perrin in New York. Her areas of experience include risk management, revenue enhancing strategy development and market entry analysis for financial services companies. Ms. Chase-Jenkins holds an MBA in finance from Columbia University Graduate School of Business.

Ian B. Farr is a principal of Towers Perrin in London. His area of expertise includes risk and capital management, financial reporting and demutualizations. Mr. Farr is a Fellow of the Institute of Actuaries.

ERM IS ULTIMATELY ABOUT CREATING SHAREHOLDER VALUE

If risk management was once a strictly defensive activity for insurers, it no longer is. Insurers' principal objectives in using an integrated approach to risk management are to improve risk-based decision-making (60%), make more effective use of capital (50%), and improve shareholder value (37%).

Fewer respondents today cite defensive actions as one of their principal objectives for improving risk management. Thirty percent say their objective is to protect shareholder value; 27% say it is to manage earnings volatility, and 26% say it is to comply with regulatory changes.

ECONOMIC CAPITAL: A KEY TOOL ON THE FAST TRACK

The 2004 study clearly shows how important and widespread the use of economic capital is in the global industry. An overwhelming majority of respondents, in fact, in the current study, say that they either use or plan to use economic capital to improve capital allocation and to make risk-based decisions. Specifically, 53% of respondents are currently using economic capital as a decision-making tool, and 28% plan to do so.

Currently, economic capital is widely used in risk-based decision making at the company, business unit and product levels. Roughly three-quarters of respondents that use capital economics use it in actual organizational decision making. For instance:

- Seventy-five percent use economic capital to allocate capital at the company level, 70% at the business unit level, and 53% at product level.
- Seventy-four percent use economic capital at the company and business unit levels to measure risk-adjusted performance, while 50% use economic capital at the product level for that purpose.
- Seventy-four percent use economic capital at the company level to make strategic or tactical decisions, 53% do so at the business level and 30% at the product level.
- Ninety percent of respondents use economic capital in product design and pricing.

Industry executives also use economic capital calculations to communicate at the company level with shareholders, rating agencies, and regulators. Such communication is widespread, with the focus being on shareholders (96%) and rating agencies (92%), ahead of regulators (84%).

ENHANCED RISK AND CAPITAL MANAGEMENT ARE ALREADY MAKING A DIFFERENCE

Enhanced risk and capital management approaches are already influencing key decision making in major areas of the insurance business. For instance, insurers report that risk management considerations

EXHIBIT 1
Who Is Responsible for Risk Management?

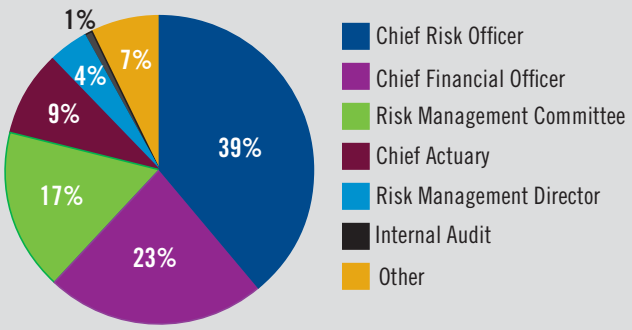
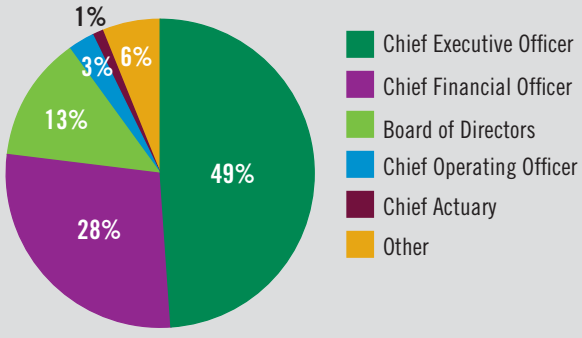


EXHIBIT 2
Where Does the Risk Management Function Report?



Source: Tillinghast benchmarking survey, *Adding Value Through Risk and Capital Management — 2004 ERM Survey Update*

"The widening use of risk and capital management tools will likely continue to increase the influence of these approaches on critical decision making."

have caused them to change business decisions in such critical areas (see *Exhibit 3*).

Moreover, the widening use of risk and capital management tools will likely continue to increase the influence of these approaches on critical decision making. Today, for example, 64% of respondents to the 2004 survey report that they use these tools for asset/investment strategy, while another 19% say they will do so in the next 12 to 24 months. The percentages of industry experts who use risk and capital management strategies for product pricing are equally significant; 61% already use them, and another 22% say they will begin to do so over the next two years.

Respondents report similar planned increases in the use of these tools for annual business planning, business reinsurance purchasing, strategic planning, product design, and product mix decisions.

STILL EVOLVING

While insurers have made great progress, especially over the past two years, in using integrated risk management processes and economic capital assessments to improve risk-based decision making at all levels of the organization, it is clear that holistic risk management, especially using economic capital as a critical tool, is still a "work in progress."

Risk Management

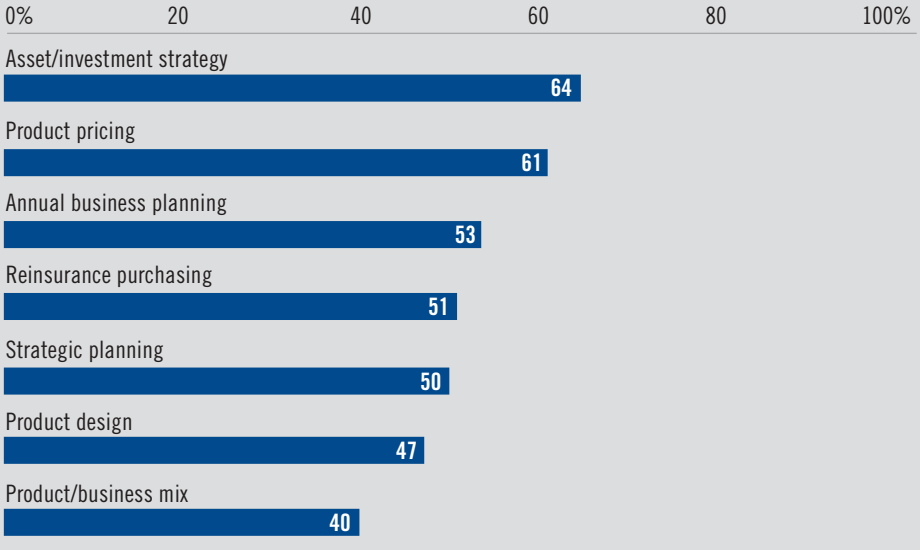
For one thing, there is a clear gap between what insurers want ERM to do and where they are in their current improvement efforts. They *want* ERM to help build shareholder value through improved decision making and more effective use of capital. But their current improvement efforts still focus on many of the fundamentals of integrated risk management, e.g., internal risk reporting procedures, measurement and quantification of insurance risks, and improving risk identification and prioritization processes.

There is relatively little focus on the actions that would ensure that the organization is creating shareholder value. For example, only about 40% are focused on incorporating EC considerations and risk management into regular decision making and less than 10% are focused on incorporating risk considerations into incentive compensation (see *Exhibit 4*).

A second indication that integrated risk management is still evolving shows up in the variety of bases that insurers primarily use to measure the impact of risk. About one-third use regulatory or statutory bases; a little more than 20% use GAAP or IAS bases, while just under 40% use economic bases.

The choice of bases gives an indication of the orientation of the company in terms of its risk focus. The use of regulatory or statutory bases suggests a focus on regulatory compliance and policyholder protection. The use of GAAP and IAS bases suggests a focus on shareholder interests, but only to the extent these are represented by published accounting statements. Use of an economic basis signifies a recognition that neither regulatory nor accounting statements are perfectly aligned with the interests of policyholders and shareholders.

EXHIBIT 3
Areas Influenced by Risk-Based Decision Making



Source: Tillinghast benchmarking survey, *Adding Value Through Risk and Capital Management — 2004 ERM Survey Update*

EXHIBIT 4
Goals of Planned Improvements in Risk Management

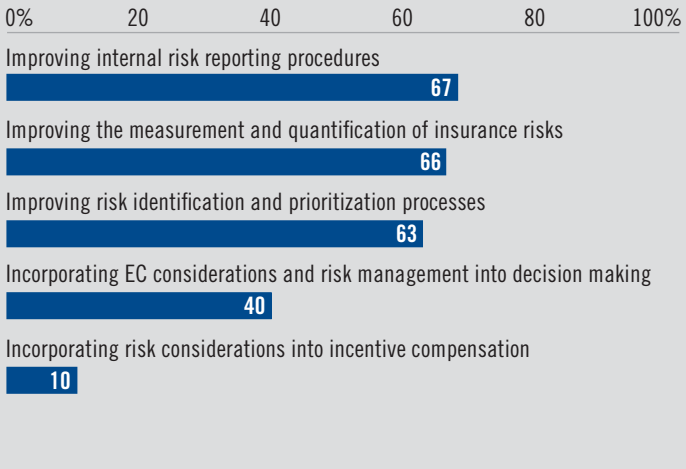
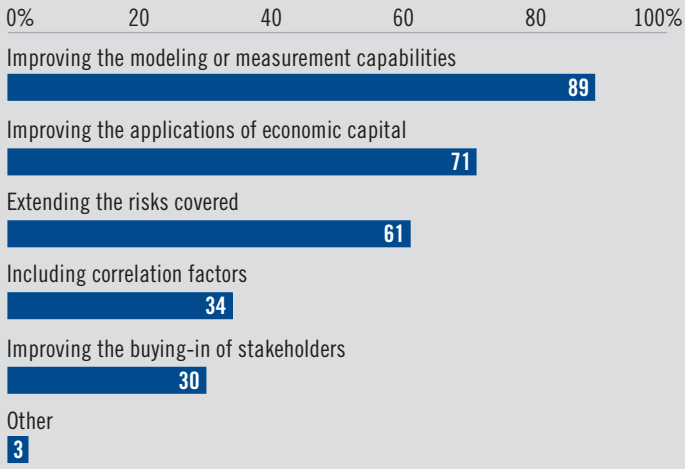


EXHIBIT 5
Goals of Planned Improvements in Economic Capital



Source: Tillinghast benchmarking survey, *Adding Value Through Risk and Capital Management — 2004 ERM Survey Update*

Thus, the economic basis gives a more comprehensive and sophisticated understanding of the totality of risks to which the firm is exposed. And for this reason, an economic basis constitutes a best practice that we think more insurers will adopt.

A third indication that integrated risk management remains a work in progress for insurers is the extent of risks included in their risk management processes and those that they quantitatively measure. Overall, insurers are more likely to include market and insurance risks in their risk management programs than operational risks. Similarly, insurers are more likely to measure market and insurance risks quantitatively than operational risks. As recent events in the industry argue so compellingly, a truly effective risk management approach absolutely must include operational risks.

A fourth, and perhaps the most telling, sign of integrated risk management as continually evolving is an underdeveloped use of risk aggregation — supposedly the *sine qua non* of holistic risk management. The most prevalent answer to the question "What methodology do you use for aggregating risk?" is "none."

Economic Capital

While calculating and using economic capital is now relatively common, the techniques are still evolving. Insurers overwhelmingly say they have more work to do, but have a good idea of what that work is. Nearly all (87%) say they intend to improve their EC calculations. Those planning to make improvements (see *Exhibit 5*) are doing so in:

- **Modeling or measurement capabilities (89%).** Ninety-six percent of European companies say they are planning to do so; 81% of North American companies intend to do so.

- **The applications of EC — 71% for all respondents.** Eighty-two percent of European companies will make this process an improvement focus; only 56% of North American companies plan to do so — a finding that suggests that North American companies still need to get more of the basic EC processes in place before they can improve applications of EC.

- **Extending the risks covered — 61% for all respondents.** Forty-eight percent of European companies plan to do so (European companies already include more risks in their EC calculations than do North American companies). Seventy-two percent of North American companies plan to do so, suggesting that this aspect is one of the critical, fundamental areas that they will have to improve before extending the applications of EC.

OBSTACLES IN THE ROAD AHEAD

While insurers have a clear vision of what they need to do to continue improving both integrated risk management and their assessment of economic capital requirements, the road ahead may not be smooth. Industry executives cite a number of barriers. The most prominent of these is the inadequacy of resources (cited by more than 60% as the number one barrier). Insurers will have to wrestle with whether or not they can expend additional resources on this more sophisticated approach to managing their businesses. But in today's world whole enterprises can be put at risk by market movements, unprecedented natural disasters, and what had once been unthinkable — human malice. Hence given the frailty of the industry's own people and systems, the real question may be "how can we afford not to?"

Comments or questions may be e-mailed to linda.chase-jenkins@towersperrin.com or ian.farr@towersperrin.com.

TOWERS PERRIN
TILLINGHAST

ECONOMIC CAPITAL: A KEY TOOL ON THE FAST TRACK FOR RISK-BASED DECISIONS

As reported in Tillinghast's recent survey on *Advanced Risk and Capital Management for Insurers*, our findings showed a significant increase (20 percentage points) in the importance of capital management from 2002. Industry executives now recognize that integrating economic capital (EC) with their company's overall enterprise risk management (ERM) program will lead to better risk-based decisions. In fact, using risk management to make more effective use of capital was the second leading objective cited by survey respondents in 2004, whereas, in 2002, capital management allocation was ranked as the eighth leading business issue. This shift in focus highlights the growing importance of EC for insurers around the globe. In this article, we take a more in-depth look at what EC is, how its use varies in different markets and why EC is a key tool on the fast track for risk-based decision making.

DEFINITION OF EC

EC is the amount of capital that banks and insurance companies set aside as a buffer against potential losses from their business activities. EC is differentiated from accounting capital because it is typically measured using a market-consistent economic balance sheet. For banks, the Basel II capital adequacy guidelines have provided increased incentives for developing and managing internal capital on an economic basis.

Similarly, the proposed Solvency II regulation of the International Actuarial Association (IAA) requires insurance companies to develop their solvency capital using a three-pillar approach:

- **Pillar 1** defines a set of target capital requirements necessary for ascertaining companies' financial solvency.
- **Pillar 2** includes a supervisory review of the capital models in place — this will particularly apply to proprietary models set up to develop EC (as compared to formula-based approaches).
- **Pillar 3** will establish market disclosure measures intended to serve as best practices.

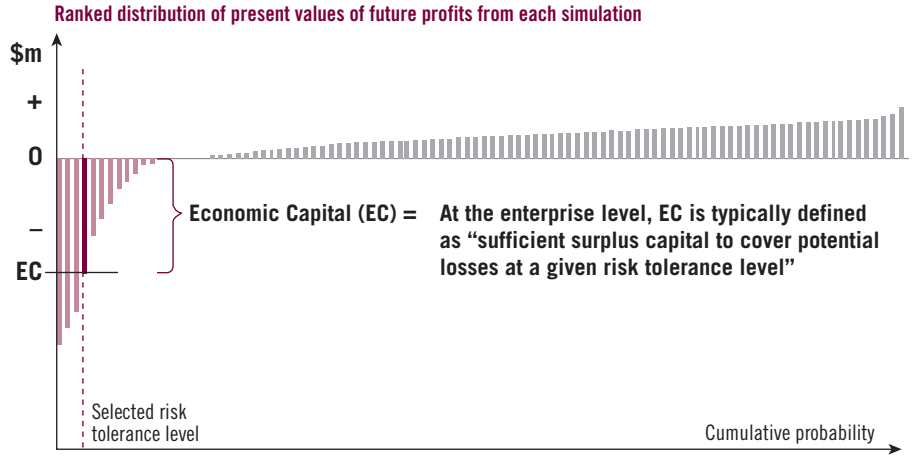
All types of risks will be included, covering both financial and nonfinancial (operational) events. Under the proposed regulation, companies that are able to demonstrate sound risk management practices (e.g., including the hedging of tail risks) can expect to benefit by having lower capital requirements.

At the same time, U.S. regulatory bodies are introducing new capital and reserving requirements for life insurance and annuity products with equity guarantees that will lead to increased pressure on capital. Given this environment, it is not surprising to find a growing number of life insurers paying greater attention to calculating the appropriate level of capital for their business and risk profile. Rating agencies are continuing to put similar pressure on the capital adequacy of U.S. property/casualty insurers.

CALCULATING ECONOMIC CAPITAL

In North America, EC is typically defined as "sufficient surplus capital to cover potential losses at a given risk tolerance level." This is illustrated in *Exhibit 1*.

EXHIBIT 1
An Illustrative Example of How EC Is Calculated

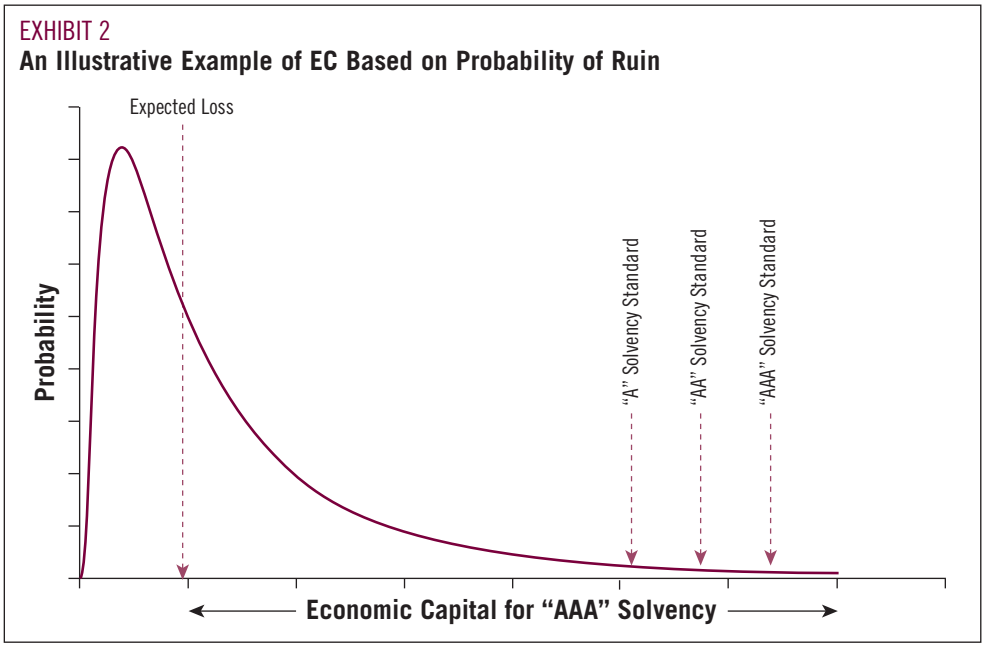


The ultimate aim of EC is to arrive at a realistic economic measure of the amount of capital that a firm needs to cover losses at a certain risk tolerance level, irrespective of regulatory rules or accounting conventions.

There are various methods for determining EC. A common methodology is to base EC on the probability of (statutory) ruin, which is the probability that liabilities will exceed assets on a present-value basis at a given future valuation date, resulting in technical insolvency. This is illustrated in *Exhibit 2*.

EC based on the probability of ruin is determined by calculating the amount of additional assets needed to reduce the probability of ruin to a target specified by management. When setting this target, management takes several factors into consideration that relate primarily to the solvency concerns of policyholders. This is usually expressed in terms of the minimum financial strength rating that management desires from rating agencies.

EXHIBIT 2
An Illustrative Example of EC Based on Probability of Ruin

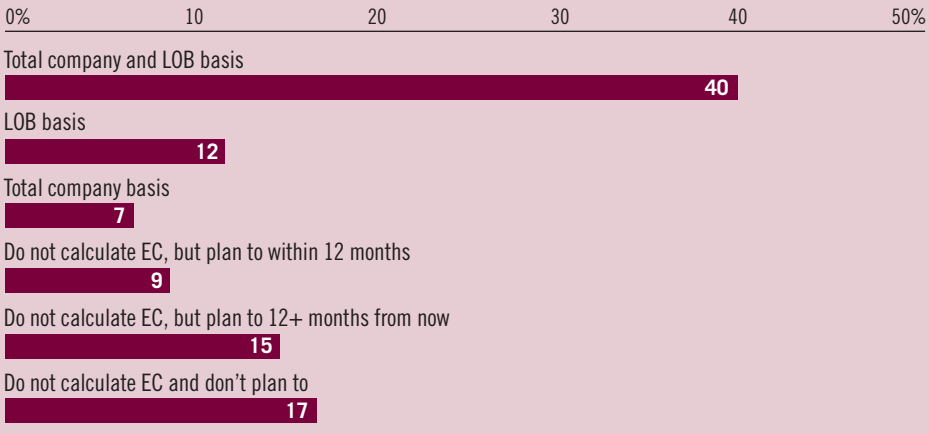


RECENT MARKET TRENDS

There is plenty of evidence that the use and significance of EC is growing in the North American insurance industry:

- According to a recent audience poll conducted at a joint educational seminar sponsored by Tillinghast and the Society of Actuaries, nearly 60% of respondents calculate EC on a total company or line-of-business basis. Of the remaining respondents, 24% plan to calculate EC in the near future *(Exhibit 3)*.
- To date, risk and performance measurement have been the two key drivers of EC implementation. In the future, we expect greater impetus to come from competitive forces as well as regulatory and rating agency pressures.

EXHIBIT 3
Many Companies Calculate EC on Both a Total Company and LOB Basis



Source: Tillinghast audience poll, "Advanced Risk and Capital Management Using Enhanced Financial Models" (March 2004)

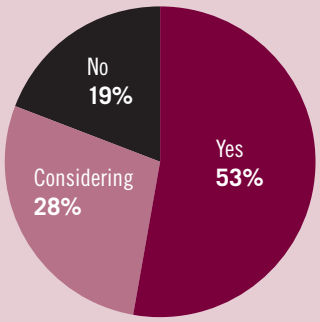
The use of EC by North American companies appears to be driven primarily by regulatory requirements and rating agency views toward capital, rather than a purely economic view of capital.

■ Tillinghast's 2004 risk and capital management survey findings further demonstrate how important and widespread EC has become globally for the insurance industry. In fact, an overwhelming majority of respondents state that they either use or plan to use EC to improve capital allocation and risk-based decision making. Specifically, 53% of respondents currently use EC as a critical decision-making tool, and 28% plan to do so *(Exhibit 4)*. This trend is consistent with the findings from our U.S. audience poll. Globally, P/C businesses and reinsurers have a slightly higher use of EC (60% and 56%, respectively) than life insurers. Only about one-fifth of respondents (19%) have no plans to calculate EC.

Today, EC is widely used in risk-based decision making at the company, business unit and product level around the globe. Roughly three-quarters of survey respondents use EC in organizational decision making. In particular, among those already using economic capital:

- Seventy-five percent use EC to allocate capital at the company level; 70% at the business unit level, and 53% at the product level.
- Seventy-four percent use EC at the company and business unit levels to measure risk-adjusted performance, while 50% use economic capital at the product level for that purpose.
- Seventy-four percent use EC at the company level to make strategic or tactical decisions; 53% do so at the business level, and 30% at the product level.
- Ninety percent of respondents use EC in product design and pricing.

EXHIBIT 4
EC Calculations Are Becoming Mainstream for Insurers



Source: Tillinghast survey, *Adding Value Through Risk and Capital Management* (January 2005)

Industry executives also use EC calculations to communicate at the company level with shareholders, rating agencies and regulatory bodies. Such communication is widespread among the Tillinghast ERM survey respondents, with the highest focus being on shareholders (96%), followed by rating agencies (92%) and regulators (84%).

REGIONAL DIFFERENCES IN CURRENT PRACTICE

There is widespread agreement about the benefits of using EC in risk management programs and strong similarities in the way global insurers currently use EC; however, there are some clear regional differences in the way insurers define the liabilities in their EC calculations and in the measures they use to determine their level of risk tolerance.

The ultimate aim of EC is to arrive at a realistic economic measure of the amount of capital — defined as assets in excess of liabilities — that a firm needs to cover losses at a certain risk tolerance level, irrespective of regulatory rules or accounting conventions. But the use of EC by North American companies appears to be driven primarily by regulatory requirements and rating agency views toward capital (i.e., a response to external pressures), rather than a purely economic view of capital. Executives in other regions, particularly in Europe, are more likely to use economic definitions of liabilities in their calculations of EC, both for internal purposes and in preparation for the new insurance accounting standards (IAS) accounting requirements.

The North American "bias" toward a regulatory view is clear in the way that respondents to Tillinghast's risk and capital management survey define the liabilities they include in EC calculations. For example:

- In aggregate, 41% of survey respondents define them as regulatory or statutory liabilities. But in North America, the number goes up to 55% and in Europe, it is just 28%.
- Ten percent of total respondents define them as GAAP liabilities, but that number is 15% in North America and only 7% in Europe.
- Forty-nine percent of all respondents define them as economically determined liabilities in the following ways: mark-to-market liabilities (22%), best-estimate liabilities (18%) and other (9%). But in North America, only 28% of respondents use "pure" economic definitions of liabilities, while in Europe, 52% of companies use such economic definitions, and in Asia 55% do.

The vast majority of companies are using stochastic models to determine the right level of capital for their business.

We believe the best practice for determining EC is to look beyond statutory requirements to a more realistic economic measure, independent of accounting and regulatory biases. Economic measures are intended to provide a better representative of the reality of the business.

MEASURING ECONOMIC CAPITAL

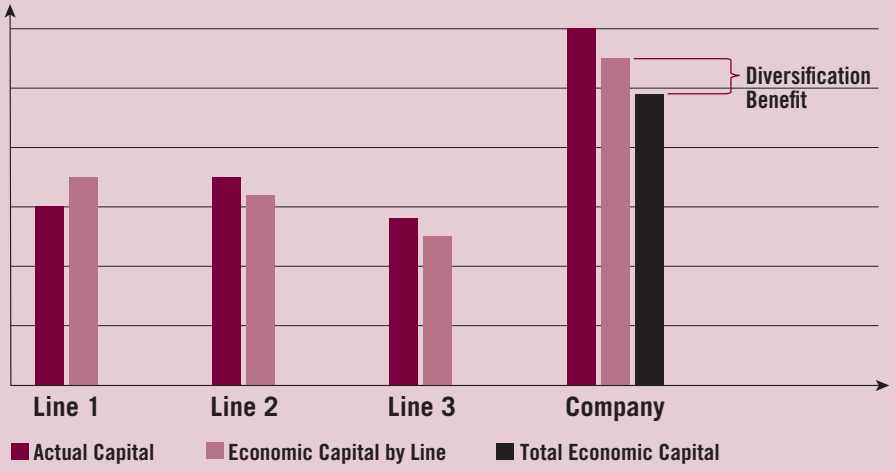
To properly measure EC, companies need state-of-the-art stochastic modeling tools. In particular, a conditional tail expectation (CTE or Tail VaR) measure is used for setting regulatory capital as part of the new C-3 Phase II proposal of the American Academy of Actuaries for variable insurance products (RBC C-3 Phase II), expected to become effective at year-end 2005. The new capital standard is based on the average required surplus for the worst 10% of outcomes, i.e., CTE (90) using a set of 1,000 or more stochastic scenarios, and taking into account reserves held.

When determining EC, various risk tolerance measures are currently used in the insurance industry. The vast majority of companies are using stochastic models to determine the right level of capital for their business. When calculating EC, insurance companies typically allow for the diversification benefit that results from combining products with different risk profiles. The resulting diversification benefit can be allocated at the line-of-business level (by requiring less capital), or at the corporate level. This is illustrated in *Exhibit 5*.

There are a number of possible explanations for the variation in risk tolerance measures. First, the drivers of EC are different for each region. For example, as we saw earlier, North American companies are much more attuned to rating agency and regulatory considerations for determining economic capital. For this reason, they are more likely to measure risk tolerance based on Tail VaR or CTE, since that is what regulators in North America have come to request. The Canadian regulator (OSFI) introduced the use of a CTE measure for defining required capital on segregated fund products in 2000. In the U.S., a proposed regulation for variable annuity risk-based capital, which is likely to be enacted by year-end 2005, will also be based on CTE measures. It should be noted that CTE or Tail VaR measures are coherent* risk measures, while VaR-based measures are not.

EXHIBIT 5

Diversification Benefit Typically Resides at the Corporate Level



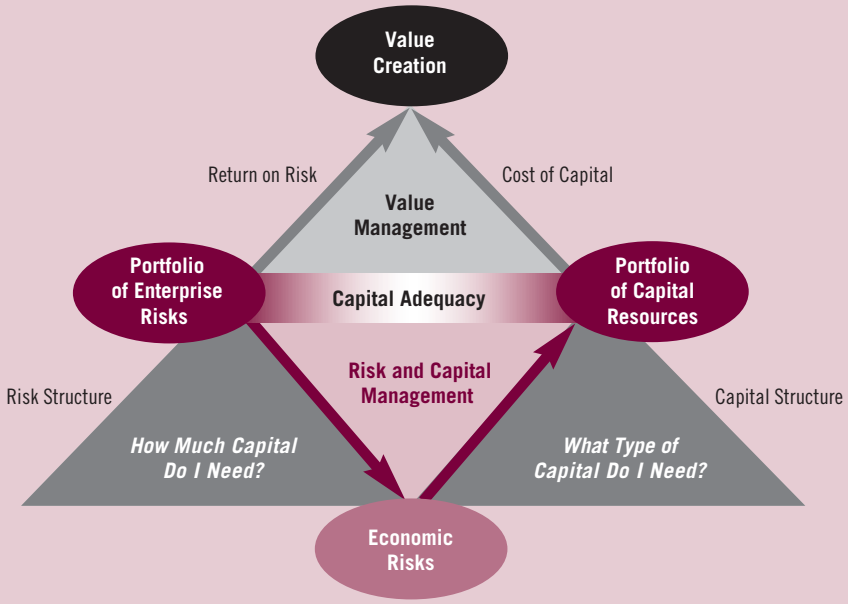
Source: Tillinghast case study

*Coherent risk measures follow the Principle of Subadditivity, i.e., Risk (X+Y) = Risk (X) + Risk (Y). See Artzner, Delbaen, Ebner and Heath (1999).

The predominant use of EC today is for communicating with shareholders, regulators and rating agencies.

Second, the different ways that insurers use EC account for some of the variation in measures. As discussed earlier, the predominant use of EC today is for communicating with shareholders, regulators and rating agencies. This may explain why so many companies, especially in Europe, use "probability of ruin" as their key measure of economic risk. This is easier to explain to stakeholders than other measures, such as below-target risk or economic cost of ruin. Thus, at this stage in the development of EC as a strategic tool for insurers, some industry executives may be making a trade-off between the technical sophistication of a measure and its internal and external "explainability." A clear communication of methodology and rationale for setting EC can do more to help increase shareholder value than a sole focus on technical sophistication.

EXHIBIT 6
Tillinghast Risk-Capital-Value Framework



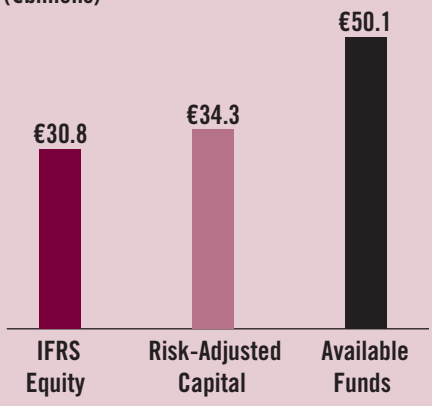
USES OF EC

Across the world, EC pioneers have been the multinationals and the larger insurance organizations. Companies that have implemented EC use it to determine and manage to the "right" level of capital for each line of business and to better manage their overall business. Leading-edge companies use EC to relate decisions on the risks they take to decisions on the capital they use to finance their business *(Exhibit 6)*.

In March 2005, Allianz Group published its 2004 financial results, including disclosure on embedded values and the group's risk-adjusted capital, which had been calculated, using banking EC principles, as the minimum amount of capital required to ensure the group's financial solvency over a one-year time horizon, based on an "A" financial strength rating. The results are illustrated in *Exhibit 7*.

While the resulting risk-adjusted capital of €34.3 billion exceeded the group's IFRS equity of €30.8 billion, it was significantly less than the group's total available funds of €50.1 billion at year-end 2004.

EXHIBIT 7
EC Calculation for Allianz Group
(€billions)



Source: Allianz Group Financial Report (2004)

EC answers the question: "How much capital do we need to hold, given our company's risk profile?"

There are many other uses of EC, all of which require stochastic modeling. In particular, the proposed capital requirements for variable annuity providers in the U.S. are expected to lead to a significant increase in capital from current levels. It's noteworthy that this marks the first time that regulatory capital in the U.S. is being defined by employing company-specific EC models using a principles-based framework. In Canada, this type of regulation was implemented in late 2000.

THE LINK BETWEEN EC AND REGULATORY/RATING AGENCY CAPITAL

Regulatory and rating agency capital requirements are motivated fundamentally by solvency concerns. Regulators use capital to determine a company's financial solvency. Rating agencies are mainly concerned with the level of financial strength and general creditworthiness of an organization. These ratings provide a prospective evaluation of an insurer's financial security to its policyholders and debt holders. Capital requirements are generally targeted using simplified methods (e.g., factor approaches) at levels appropriate for the aggregate industry and cannot reflect the nature of the company's risks to the degree that can be achieved through a customized internal model.

The motives behind calculating EC involve the "appropriate" amount and allocation of capital to the risks undertaken by the company. EC answers the question: "How much capital do we need to hold, given our company's risk profile?" The level should be sufficient for an ongoing entity and reflect the degree of contribution of risk to the company. Holding too little EC threatens the ability of the company to meet its obligations; holding too much will unnecessarily reduce return on equity and potentially distort rational, economically based decision making.

Emerging trends for regulatory and rating agency capital are based on methods linked to internal models. These will closer align regulatory/rating agency and EC levels.

Standard & Poor's recently created a dynamic model called Financial Product Capital (FPC) to measure the required EC, replacing the capital adequacy model historically used by Standard & Poor's. Other major rating agencies like A.M. Best, Fitch and Moody's are also rolling out new capital adequacy models that give greater regard to companies' proprietary capital models for developing EC.

The primary rationales for these new models and methodologies are:

- increased sophistication of risk management practices at many companies
- failure of factor-based approaches to properly deal with risks inherent in current products and investment strategies
- inquiries from companies seeking quantitative recognition of risk management practices, including the quality of their product structures
- pressure on companies to optimize their capital base.

RATING AGENCY VIEWS

Over the last five years, the insurance industry in the U.S. has been adapting the concept of ERM and other new technologies, such as EC tools, that have emerged in the financial markets. As a result, rating agencies are responding to this new trend by adopting new criteria and tools to enhance their assessment of a corporation's risks.

Rating agencies primarily use static models based on statistical studies, historical experience or subjective opinions to measure risks that are typical for a type of asset or line of business in the U.S. life insurance industry. However, this is changing, based on the increased sophistication of the insurance industry and new technology available to manage and measure risks.

For example, Standard & Poor's applies models to determine the amount of capital and liquidity that a company is expected to hold against potential losses for financial market, credit, operational and liquidity risks that relate to a specified business activity or "book." Capital is the safety cushion that can absorb adverse loss experience across a wide range of risks.

The CTE approach described above is beginning to be accepted by regulators and rating agencies as a dynamic, company-specific way to capture the tail risks of highly complex products such as variable annuities with investment guarantees.

As more dynamic and sophisticated methodologies are developed, and as insurers implement better risk management controls and processes, rating agencies will be better positioned to begin embracing a company's internal approaches to calculating EC.

The main differences among the various definitions of EC lie in the methodology, assumptions and quality of data used by various parties, and the sophistication of the tools used to measure and differentiate among the various risks embedded in insurance books. As more dynamic and sophisticated methodologies are developed, and as insurers implement better risk management controls and processes, rating agencies will be better positioned to begin embracing a company's internal approaches to calculating EC.

A BRIGHT OUTLOOK FOR EC

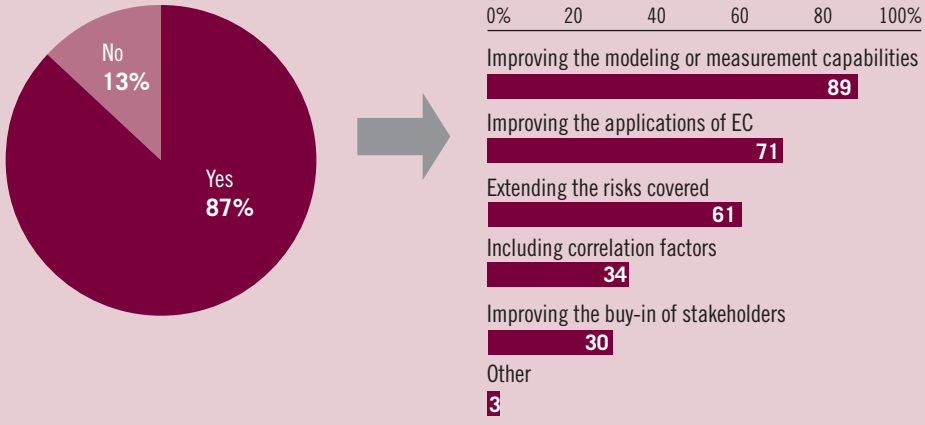
Finally, our risk and capital management survey results clearly validate the notion that EC is critical to successfully implementing ERM. Among those companies planning improvements to their ERM framework, 71% of respondents cited improving the application of EC as one of their key goals *(Exhibit 8)*.

Of those companies planning improvements, the most frequently mentioned goals are improving the modeling or measurement capabilities (89%), improving the applications of economic capital (71%) and extending the risks covered (61%).

Objectives vary depending on where companies are in the process. North American companies plan to extend their risk coverage (72%) while European companies plan to improve the applications (81%).

EXHIBIT 8

EC Is Critical to Successful ERM Implementation



Source: Tillinghast survey, *Adding Value Through Risk and Capital Management* (January 2005)

Implementing an EC framework allows a consistent measurement of risk-adjusted value creation across all lines of business. Leading insurers in all major markets are already utilizing this concept. Moreover, rating agencies, analysts and governing bodies around the world are showing an increasing interest in applying EC. Given the growing sophistication of companies' risk management techniques and increased scrutiny by outside constituents, we expect that the methodologies for developing and implementing EC will continue to evolve over time, making EC a standard tool for risk and capital management for insurers worldwide.

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