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## Product Preview



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**LOMBARDI, CHAPTER 1,  
OVERVIEW OF VALUATION REQUIREMENTS**

I. Introduction

- A. Determination of reserves is important actuarial function.
- B. Reserves include claim or loss reserves and policy reserves.
- C. Actuarial or policy reserves are determined using an actuarial valuation.

II. Role of Reserves is to properly match revenues and costs.

III. Actuarial Assumptions

- A. Expenses, investment returns, mortality, morbidity, voluntary terminations and taxes.
- B. Based on company's past experience, industry studies, regulatory requirements and judgments about the future.
- C. They affect the timing of reported earnings.

IV. Accounting Principles

A. Statutory Accounting Principles (SAP)

- 1. Emphasis is on solvency.
- 2. Focus is on the balance sheet.
- 3. NAIC assists state officials to provide standards.

B. Generally Accepted Accounting Principles (GAAP)

- 1. Established primarily by FASB.
- 2. Emphasis is on matching of current revenue with current costs.
- 3. Focus is on income statement.

C. International Accounting Standards (IAS)

- 1. Developed by IASB.
- 2. Transparency and comparability are the objectives.

D. Tax Basis Accounting

- 1. Tax reserves are computed according to DEFRA of 1984.
- 2. DAC tax is defined in the Revenue Reconciliation Act of 1990.

E. Fair Value Accounting

- 1. SFAS 115 adopted in 1993, was a preliminary step toward fair value accounting.
- 2. Hierarchy for determining fair value
  - a. Market value when available.
  - b. Market value of similar instruments with appropriate adjustment.
  - c. Present value of projected cash flows.

## V. Types of Valuations

### A. Statutory Valuations

1. Conservative.
2. Prescribed in the US.
3. Increasingly, reliance on US valuation actuary.
4. In Canada, responsibility is on appointed actuary.
5. Canadian prescribed reserving method is CALM.

### B. GAAP Valuations

1. Based on company experience with modest PfADs.
2. Incorporate explicit recognition of all material actuarial assumptions.
3. Another difference with statutory valuation is the DAC asset.

### C. Tax Reserve Valuations

1. In US, from 1958 to 1984, based on statutory reserves with some adjustments.
2. Starting in 1984, Federally Prescribed Tax Reserves
  - a. CRVM for life insurance and CARVM for annuities.
  - b. Interest is larger of AFIR and prevailing state assumed interest rate.
  - c. Prevailing Commissioners standard mortality table in at least 26 states.
3. In Canada, changes in 1978, 1988 and 1996.
4. In Canada, for policies issued prior to Jan 1, 1996
  - a. Max reserve is calculated using 1½ year preliminary term with a CV floor.
  - b. Lower than NLP and 1 year preliminary term.
  - c. For group term policies of less than 1 year, unearned premium reserve.
5. In Canada, for policies issued after Dec 31, 1995
  - a. Max reserve is lesser of reported reserves and policy liabilities.
  - b. Both are calculated without reference to income or capital taxes.
  - c. For group term policies, no change.

### D. Gross Premium Valuations

1. Best estimate value of liabilities.
2. In the case of merger and acquisition.
3. When company examined to determine solvency.
4. Little or no provision for conservatism.

### E. Embedded Value

1. Sum of value of in force business and adjusted net worth.
2. Value of in force business
  - a. PV of projected after-tax statutory earnings – change in required capital.
  - b. Earnings are discounted using cost of capital.
  - c. Cost of capital is rate of return offered by similar investments.
  - d. CAPM cost of capital = risk-free rate + risk premium.
3. Adjusted net worth
  - a. Market value of assets supporting statutory surplus, plus
  - b. PV of cost of capital for holding required capital.

### VI. Effects of Statutory Valuation Requirements

- A. Gross Premium Levels: indirect impact.
- B. Product Design.
- C. Federal Income Taxes: minor effects.
- D. Dividends to Policyholders: can have a significant effect.
- E. Statutory Earnings and appraisal value.
- F. Important Indicators,

### VII. Statutory Valuation Requirements in Canada

#### A. Insurance Companies Act of 1992 created the role of the appointed actuary

1. Appointments made and terminated by board of directors.
2. Actuary will value and report on actuarial liabilities.
3. Actuary will report to board on current financial position of company.
4. Actuary may be directed to report on future financial position of company.
5. Actuary must have access to all company records and information.
6. Actuary must report on material circumstances to management and board.
7. If not corrected, must send report to OSFI.
8. Actuary must render opinion on administration of dividend policy prior to distributions.

#### B. Standards of Practice for the Appointed Actuary (AA)

1. Developed by CIA, the national organization of actuarial profession in Canada.
2. Recommendations deal with
  - a. Verification of valuation data.
  - b. Development of appropriate assumptions.
  - c. Choice of valuation method.
  - d. Text and implications of reports accompanying statements.
  - e. Documentation of valuation actuary's work.
  - f. Use of approximations.
  - g. Judgment regarding materiality.

3. Also, many CIA publications.
  4. CLIFR and OSFI also provide annual documents.
  5. OSFI Requirement of periodic external review
    - a. To maintain and strengthen confidence.
    - b. To narrow range of practice of Aas.
    - c. To improve quality of AA's work.
    - d. To provide significant professional education for AA.
  6. CIA developed standards of practice for external review process.
- C. The Canadian Asset Liability Method (CALM) is a prospective method using
1. Full gross premium for the policy.
  2. Estimated expenses and obligations under the policy.
  3. Current expected experience assumptions plus margin for adverse deviations.
  4. Scenario testing for interest rate and market risks.
- D. Minimum Continuing Capital and Surplus Requirements (MCCSR)
1. Assuris is an association protecting policyholders against loss due to insolvency.
  2. Every company is required to be a member.
  3. Assuris facilitates transfer to solvent company.
  4. Assuris is a not-for-profit organization funded by assessments of its members.
  5. Assessment base is MCCSR, similar to RBC in the US.
  6. Assessment may continue indefinitely at a rate of 1.33% of MCCSR.
- E. Dynamic Capital Adequacy Testing (DCAT)
1. Base and other scenarios suggested for investigation.
  2. Other scenarios appropriate according to AA.
  3. Scenarios include in force and anticipated new business.
  4. Written report to board.
- F. Joint Policy Statement
1. Issued by CIA and CICA in 1991.
  2. Recognizes that either the actuary or the auditor could use specialized work of other.
  3. Aspects of the work that should be considered
    - a. Qualifications, competence, integrity and objectivity.
    - b. Appointment to do the work.
    - c. Whether he followed standards.
    - d. Appropriateness of findings and opinions.

## VIII. Statutory Valuation Requirements in the United States

### A. Introduction

1. NAIC Manual published in 1998
  - a. Preamble.
  - b. Statements of Statutory Accounting Principles (SSAPs).
  - c. Appendices.
2. Does not preempt state laws and regulations.
3. Actuary should be familiar with concepts underlying RBC.

### B. SSAP No. 50 provides general framework to classify contracts into

1. Life Contracts.
2. Accident and Health Contracts.
3. Property and Casualty Contracts.
4. Deposit-type Contracts.

### C. SSAP No. 51

1. Establishes principles for income recognition and policy reserves.
2. For all contracts classified as life contracts.

### D. Appendices A-820 and A-822

1. Contains excerpts of
  - a. NAIC model Standard Valuation Law (SVL).
  - b. Model Actuarial Opinion and Memorandum Regulation.
2. Qualified actuary is appointed by board and called appointed actuary (AA).
3. AA must issue a statement of actuarial opinion.
4. Statement should list items and amounts for which AA expresses opinion.
5. Opinion is on adequacy of reserves in aggregate.
6. Statement frequently indicates reliance on others.
7. Statement should indicate relationship with company and scope of work.

### E. ASOP No. 22

1. Section 3.1: Review and apply ASOP No. 7.
2. Section 3.2: AA should meet qualification standards of AAA.
3. Section 3.3: Form, content and recommended language.
4. Section 3.4: Appropriate analysis methods.



**LOMBARDI, CHAPTER 2,  
NAIC ANNUAL STATEMENT**

I. Statutory Annual Statement

A. Introduction

1. Must comply with standards as adopted by each state.
2. Format and content specified by NAIC.
3. Many companies must file several different statements.

B. Primary Financial Statements

1. Balance Sheet.
2. Summary of Operations.
3. Capital and Surplus Account.\*
4. Cash Flow Statement.\*
5. Analysis of Operations by Lines of Business.

C. Primary Actuarial Schedules and Exhibits

1. Analysis of Increase in Reserves During the Year.\*
2. Exhibit 1 – Part 1 – Premiums and Annuity Considerations.
3. Exhibit 5 – Aggregate Reserve for Life Policies and Contracts.
4. Exhibit 8 – Policy and Contract Claims.
5. Exhibit of Life Insurance.\*
6. Exhibit of # of Policies, Contracts, Certificates, Income Payable and Account Values in Force for Supplementary Contracts, Annuities, A&H and Other Policies.\*

D. Successive Equation

1. Value (E) = Value (B) + Increases – Decreases.
2. Statements and exhibits using this feature are marked above with an asterisk.
3. Balance sheet is as of a particular point in time.
4. Summary of operations spans a period of time.

II. Balance Sheet

A. Introduction

1. Under GAAP, Assets = Liabilities + Equity.
2. Under statutory accounting principles, Surplus = Assets – Liabilities.

B. Assets

1. Significant detail because industry has a lot of assets.
2. Industry performs important role as financial intermediary.
3. Bonds, Stocks, Mortgages, Real estate, Cash, Contract loans...

C. Liabilities and Surplus: Most of the liabilities are the policy reserve.



### III. Summary of Operations

- A. It presents operating results of company for a period of time.
- B. Net gain = revenue – costs.
- C. Net income = net gain + realized capital gains (after taxes).
- D. Major revenue items are premium and annuity considerations and net investment income.
- E. Major cost items are benefit payments, increase in reserves, commissions and expenses.

### IV. Capital and Surplus Account

- A. It shows how surplus changed between 2 accounting dates.
- B. Surplus (E) = Surplus (B) + Net income – Dividends + Other Charges.
- C. Dividends represent dividends to shareholders.
- D. Over a long time period, net income is primary source by which surplus grows.
- E. Net income less dividends should exceed growth rate times Surplus (B).

### V. Cash Flow Statement

- A. It shows reconciliation of cash and short-term investments between 2 accounting dates.
- B. First section demonstrates the 3 primary sources and uses of cash flow
  - 1. Cash from operations (CO).
  - 2. Cash from investment activities (CI).
  - 3. Cash from financing activities (CF).
- C. Second section shows how and why liquidity changed during the period.
- D. Cash (E) = Cash (B) + CO + CI + CF.

### VI. Analysis of Operations by Lines of Business

- A. It shows the gain from operations from major business segments of company.
- B. It provides information to do analysis of profitability.
- C. Also called Gain and Loss Exhibit.

### VII. Analysis of Increase in Reserves During the Year

- A. It shows how the policy reserve changed during the period.
- B. Res (E) = Res (B) + Net Premium + Tabular Interest – Tabular Cost + Other Changes.

### VIII. Exhibit 1 – Part 1: Premiums and Annuity Considerations

- A. Premium is major source of revenue for most companies.
- B. It shows how premiums have been adjusted from cash to accrual basis.
- C. It also shows effect of reinsurance.
- D. It splits total premiums into
  - 1. Premiums earned on policies in first policy year (indication of sales).
  - 2. Single premiums (indication of non-recurring premiums).
  - 3. Premiums earned on policies after first policy year (renewal premiums).
- E. Premium = Direct premium + Reinsurance assumed – Reinsurance ceded.

- F. Direct premium = Collected premium +  $\Delta$ Deferred premium -  $\Delta$ Advanced premium.
- G. Deferred premium reflects frequency of premium payments assumed in reserves and actual frequency of payments required.
- H. Advanced premium reflects premium received prior to valuation date but due only after that date.

IX. Exhibit 5 – Aggregate Reserve for Life Policies and Contracts

- A. One of the most important actuarial exhibits in the statement.
- B. It shows policy reserves for current period by major product line and valuation standard.
- C. Valuation standard represents methodology and assumptions used.
- D. Life, Annuities, Suppl. Contr. With Life Cont., ADB, Dis. Active, Dis. Disabled, Misc.

X. Exhibit 8 – Policy and Contract Claims

- A. It shows how certain benefit payments have been adjusted from cash to accrual basis.
- B. Due and unpaid, in course of settlements, incurred but not reported.

XI. Exhibit of Life Insurance

- A. It shows the # of policies and amount of insurance in force.
- B. It demonstrates how these values changed during the period.
- C. In force (E) = In force (B) + Issues – Deaths – Other Terminations + Other Changes.
- D. Very useful.

XII. Exhibit of Annuities: Similar purpose as Exhibit of Life Insurance.



**HERGET, CHAPTER 13,  
INVESTMENT ACCOUNTING, EXCLUDE 13.7**

I. Introduction

- A. Operations of insurance: Underwriting, investment and benefits paying.
- B. Investment operations are largely invisible to typical policyholder.
- C. Interrelationships and dependencies between functions are important.
- D. Evolution of products has resulted in increasing importance of investing function.

II. Typical Life Insurer Investments and Related Accounting Principles

- A. States have laws, rules and regulations addressing types and quantities of investments.
- B. There are statutory penalties for lack of diversification and riskier investment practices.

III. Debt Securities

A. General

1. Popular because ultimate cash flows and inherent yields are relatively predictable.
2. Key accounting considerations
  - a. Recording at acquisition.
  - b. Income recognition while security is held.
  - c. Gain or loss recognition upon sale or maturity.
  - d. Carrying value while security is being held.
3. At acquisition, recorded at cost, which includes premium/discount paid.
4. GAAP income = periodic contractual interest payments or accruals  
+ any accretion of discount or – any amortization of premium.
5. Carrying values on a GAAP basis are governed by SFAS 115
  - a. Investment is classified as HTM, Trading or AFS.
  - b. Majority is classified as AFS.
  - c. HTM securities are carried at amortized cost.
  - d. Trading and AFS securities are carried at fair value.
  - e. Changes are recognized in earnings for Trading.
  - f. Changes are recognized in other comprehensive income for AFS.
  - g. General ledger will continue to reflect them at amortized cost.
  - h. If investment is impaired and impairment not temporary, must calculate and record a loss.
  - i. Impairment occurs when fair value falls below carrying value.
  - j. Impairment is temporary if
    - a) Investor has ability and intent to hold investment during reasonable forecasted recovery period (Market dependent).
    - b) It is probable investor would recover cost through collection of amounts due (Collection dependent).

## B. Bonds

1. At acquisition, recorded at cost, which includes premium/discount paid.
2. GAAP income = periodic contractual interest payments or accruals  
+ any accretion of discount or – any amortization of premium.
3. If sold, difference between sale proceeds and amortized cost is realized gain or loss.

## C. Collateralized Mortgage Obligations (CMOs)

1. Authoritative sources: EITF 89-4, SFAS No. 91 and EITF 93-18.
2. CMOs represent pool of mortgage loans securitized.
3. CMOs are packaged in groupings of cash flows, referred to as tranches.
4. Accounting is very similar to that of a corporate bond.
5. Difference in amortization is due to prepayment
  - a. Because mortgagors move and sell their homes.
  - b. Because interest rate environment changes.
6. Investor anticipates a certain prepayment speed and thus effective yield.
7. Under retrospective method, investor must assess this yield at least annually.
8. With this revised effective yield, a revised book value is calculated.
9. Difference is booked as a true-up and credited/charged to investment income.
10. Some CMOs are principal only (PO) or interest only (IO) strips.
11. POs are generally sold at discounts.
12. With IOs, investor must reassess recoverability periodically.

## IV. Preferred Stocks

- A. When similar to debt, accounted as such.
- B. Otherwise, considered equity securities and classified as trading or AFS.
- C. These are carried at fair value in balance sheet.

## V. Common Stocks

### A. Unaffiliated Common Stock Investments: Less than 20% ownership

1. Carried at fair values.
2. Dividends recognized as earned.

### B. Affiliated Common Stock Investments: Investees (20% to 50% ownership)

1. Carried at cost  $\pm$  cumulative undistributed comprehensive income.
2. Unrealized gains/losses not reflected in financial statements.
3. Net income and other comprehensive income recognized on equity method.
4. Investor recognizes its pro-rata share in its financial statements.

### C. Affiliated Common Stock Investments: Subsidiaries (greater than 50% ownership)

1. Financial statements consolidated with those of parent company.
2. Dividends between subsidiary and parent are eliminated in consolidation.

## VI. Mortgage Loans

- A. Most tend to be first mortgages.
- B. Carried at unpaid principal balance adjusted for unamortized premiums or discount.
- C. Companies must perform annual evaluations of recoverability or collectibility.

## VII. Policy Loans

- A. Carried as invested assets at unpaid balance of loans.
- B. Interest payments are usually made at beginning of period.

## VIII. Partnerships: Accounted for by using equity method.

## IX. Short-Term Investments: Carried at amortized cost.

## X. Derivatives and Hedging Activities

- A. SFAS 133 was issued in 1998 and is comprehensive and very complex.
- B. FASB created Derivatives Implementation Group (DIG).
- C. SFAS 138 was issued in June 2000.
- D. In April 2003, FASB issued SFAS 149.
- E. Typical derivatives: swaps, options, forwards, futures, caps, floors and collars.
- F. Categories of hedges
  - 1. Fair value hedges: Gains/losses recorded in earnings.
  - 2. Cash flow hedges
    - a. Effective portion is accumulated in other comprehensive income.
    - b. Ineffective portion is recognized in earnings immediately.
  - 3. Foreign currency hedges: Same as cash flow hedges.

## XI. Insurance Contract Analysis Under SFAS 133

- A. Introduction: For contracts that combine derivatives with insurance products.
- B. Guaranteed Investment Contracts (GICs)
  - 1. Accounted for in accordance with SFAS 97.
  - 2. Traditional GICs neither meet characteristics of a derivative nor have embedded derivative components.
- C. Synthetic GICs
  - 1. Policyholder owns the assets underlying.
  - 2. They use wrapper contract that provides market and cash flow risk protection.
  - 3. Issuer, in effect, sells a put option to policyholder.
  - 4. Guarantee of cash flows constitutes a derivative.

5. Issuer accounts for synthetic GIC, in its entirety, as derivative.
6. Accounting guidance for holder depends on type of entity holding instrument and type of synthetic GIC
  - a. If holder is defined-contribution plan and type is fully benefit-responsive, guidance is SOP 94-4.
  - b. For others, guidance is SFAS 133.

D. Traditional Variable Annuity (VA): Conditions to be not within scope of SFAS 133

1. Contract is established, approved and regulated under special rules applicable to VA such as state insurance laws, securities laws and tax laws.
2. Assets are insulated from general account liabilities.
3. Premium is invested in separate accounts at policyholders' direction.
4. Insurer invests in assets on which account values are based.
5. Policyholder may redirect investment among investment options.
6. Account values are based entirely on performance of directed investments.
7. All investment returns are passed through to policyholder.
8. Policyholder may redeem contract at any time, subject to surrender charges.
9. Policyholder has voting rights in certain structures.

E. Nontraditional Variable Annuity

1. Issuer and holder share investment risk.
2. Hybrid instrument.
3. Host contract is traditional VA.
4. Nontraditional features: Analyzed to determine if are embedded derivatives.

F. Deferred Variable Annuity

1. Guarantee of minimum interest rate at annuitization does not require separate accounting during accumulation phase.
2. GMIB fails to meet definition of derivative during accumulation phase.
3. When reinsured, GMIB meets definition of derivative.

G. Variable Annuity with Guaranteed Minimum Payments

1. Accounting treatment depends on payout option
  - a. For period certain: embedded derivative during payout phase.
  - b. For life contingent: no withdrawal feature, no embedded derivative.
  - c. For period certain plus life contingent: embedded derivative related to period certain must be separated.
2. Hybrid instrument consists of host contract and embedded components.

H. Market Value Annuity (MVA)

1. Debt host contract with embedded put option.
2. Because option is exercisable by holder, it is considered clearly and closely related to debt host contract.

#### I. Equity-Indexed Life Insurance

1. Accounted for as UL contracts under SFAS 97.
2. If holder is entitled to change in value of index only at death, embedded derivative should not be separated from host contract.
3. Because host is debt host, option is not considered clearly and closely related.

#### J. Equity-Indexed Annuity (EIA)

1. Typically classified as investment contract under SFAS 97.
2. Popular designs
  - a. Periodic ratchet design.
  - b. Point-to-point design.
3. Embedded derivative is not considered clearly and closely related to host.
4. Must be separated from host contract.
5. Company should consider allocating portion of premium to option using with-and-without method.

#### K. Foreign Currency Elements of Insurance Contracts

1. Contract assessed to determine if it contains derivative under paragraph 12 of SFAS 113.
2. Scope exception in paragraph 15 may be applied during period between inception and loss occurrence dates.

#### L. Modified Coinsurance and Similar Arrangements

1. Funds-withheld payable and receivable include embedded derivative feature.
2. It is not considered clearly and closely related to host contract.
3. Embedded derivative feature generally will require bifurcation.





**ATKINSON-DALLAS, CHAPTER 16,  
FINANCIAL MANAGEMENT**

I. Introduction

A. Possible financial goals of a company

1. ROE.
2. Embedded value.
3. Consistent growth in earnings and revenue.
4. Total return to stockholders or to policy owners.

B. Factors influencing

1. Type of company.
2. Company tradition.
3. Company strengths and weaknesses.
4. Past company results.
5. Competition.
6. Regulation.
7. Financial markets.
8. Personalities and beliefs of senior management.

C. Company must manage its finances in 3 broad areas

1. Risk management.
2. Earnings management.
3. Capital management.

II. Tools of Financial Management

A. Financial Analysis

1. Organized in data warehouse.
2. Content
  - a. Income statement and balance sheet results.
  - b. Results of mortality and lapse studies.
  - c. Investment results.
  - d. Distribution of sales by product, risk class, gender, etc.
  - e. Relevant unit costs.

B. Modeling

1. Ability to project future financial results.
2. Modeling can produce results at finer levels than financial analysis can.
3. Modeling can be used to produce present values of future results.
4. It allows you to determine which products or markets are contributing and which are detracting from company's goals.
5. Can be used to estimate costs and value of adding new products, new markets, etc.

### C. Combined Financial Analysis and Modeling

1. Accumulate combined results for decisions such as
  - a. Stop offering certain products.
  - b. Exit certain markets.
  - c. Sell or close down a certain line of business.
  - d. Stay independent or seek affiliation with another company.
2. It permits calculation of long-term performance measures such as ROI or weighted average ROE.

### D. Reinsurance

1. May shift risk, earnings, capital, revenue, benefits, expenses, assets and liabilities.
2. Forms
  - a. Coinsurance.
  - b. Modified coinsurance.
  - c. YRT.
3. Effect on Stability of Earnings
  - a. Can be used to offset virtually every kind of risk to all risks.
  - b. More commonly, it is used to stabilize mortality risk.
4. Effect on Pattern of Earnings
  - a. Difference in patterns of YRT rates and expected mortality rates.
  - b. Cash flows between parties can be minimized.
  - c. Capital can be enhanced or unaffected.
  - d. When risk is transferred, required capital is also transferred.
  - e. Reinsurance can have a beneficial impact on taxes.
  - f. Reinsurance usually affects timing of solvency earnings and taxable earnings but not stockholder earnings.
5. Reinsurance as Capital
  - a. Compared to debt and equity, it can be used to more quickly obtain financing, and often at a lower cost.
  - b. Reinsurance on new business
    - i. Finances strain.
    - ii. Lowers capital requirements.
    - iii. Provides financing exactly when needed.
  - c. Assumed reinsurance is possible to put excess capital to work or to generate tax losses.
  - d. Extent is largely determined by country's regulations.
  - e. When used to provide capital, resulting increase can behave more like equity (large amount of capital in relation to future earnings) or more like debt.
6. Reinsurance can also be used to leverage company's returns.

### III. Acquisition or Sale of Business

#### A. Reasons to sell

1. To raise capital.
2. Get rid of business that does not have economies of scale.
3. Get rid of business that is no longer a strategic fit.
4. Get rid of business that has a low rate of return.

#### B. Reasons to buy

1. To build economies of scale.
2. To add value by cutting expenses.
3. To put idle capital to work.
4. To grow company for benefit of owners.

#### C. Assumption Reinsurance and Indemnity Reinsurance

1. Under assumption reinsurance, company that issued policies is removed from liability after block is sold.
2. Under indemnity reinsurance, selling company relies on reinsurer (the buyer) to reimburse seller for all benefits paid.
3. Under indemnity reinsurance, administration is transferred to buyer but seller must still show business on its books.
4. No right to recapture unless, under indemnity reinsurance, reinsurer does not perform its obligations.

#### D. Prerequisites for an Acquisition

1. Buyer must have access to capital needed.
2. Acquisition must be likely to improve buyer's earnings.
3. Buyer must have resources to complete acquisition
  - a. Differences in business practice.
  - b. Logistical nightmares.
  - c. Administrative systems.
  - d. People.
4. Many acquisitions are unsuccessful.

#### E. Prerequisites for a Sale

1. Seller must have a use for capital that will be raised.
2. Sale must be likely to improve seller's earnings.
3. Seller should carefully consider price currently available.
4. Effect of sale of block on remaining staff.

#### F. Determining the Purchase Value of an In-Force Block

1. Must agree on
  - a. Amount of liabilities buyer will assume (assume solvency reserves).
  - b. Amount of assets transferred.

2. Purchase value = Liabilities transferred - Assets transferred = SolvRes(0) - Assets(0).
3. Determining SolvRes(0) is straightforward.
4. To calculate Assets(0)
  - a. Calculate embedded value,  $EV(0) = PV$  of future distributable earnings, discounted at buyer's desired rate of return.
  - b. Minimum assets must be  $SolvRes(0) + ReqCap(0) - EV(0)$ .
  - c. Calculate taxes
    - i.  $Tax(0) = (SolvRes(0) - TaxRes(0) - PurchaseValue - TransCosts) \times EarnTaxRate$ .
  - d. Minimum assets become
    - i.  $Assets(0) = SolvRes(0) + ReqCap(0) + Tax(0) + TransCosts - EV(0)$ .
5.  $PurchaseValue = EV(0) - Tax(0) - TransCosts - ReqCap(0)$ .

#### G. New Business and Goodwill

1. Value of new business is intangible asset in stockholder accounting only.
2. Goodwill, an intangible asset, often includes
  - a. Value of future new business.
  - b. Intellectual capital.
  - c. Reputation, brand name, etc.
3. Goodwill, a risky asset, is amortized over 10 to 40 years.
4. In few countries, goodwill can be expensed immediately.
5. Goodwill may have a major effect depending on
  - a. How quickly it is amortized.
  - b. Its tax deductibility.
6. Common to include only 3 to 5 years of future new business in purchase value.

## H. Purchase Price and Purchase Value

1. No standard definition of purchase price.
2. Considerations affecting purchase value
  - a. Distributable earnings.
  - b. Embedded value.
  - c. Solvency assets and liabilities.
  - d. Effect on earnings per share and ROE.

## I. Earnings Management

1. Company can sell a loss-producing business.
2. Company can buy a business, moving its earnings up.
3. Company may grow primarily through acquisitions.

## IV. Risk Management

### A. Market Risk

1. Interest Rate Risk
  - a. Includes
    - i. Changing rates on assets and liabilities.
    - ii. Disintermediation risk.
    - iii. Mismatching.
    - iv. Accounting quirks.
  - b. Ways to control this risk
    - i. Encourage sales of products with MVA's, including variable products.
    - ii. Limit sales of products without MVA's.
    - iii. Hold extra capital to withstand rate fluctuations.
    - iv. Work with regulators and accounting bodies to bring liability and asset accounting in line.
2. Market Fluctuation Risk
  - a. Includes
    - i. Fluctuation in market value of common stocks and real estate.
  - b. Ways to manage this risk
    - i. Use volatile assets mainly to back products with MVA's.
    - ii. Limit volatile assets to a small % of overall assets.
    - iii. Hold extra capital to withstand market fluctuations.

3. Asset Valuation Risk
  - a. Includes
    - i. Overly aggressive valuation of assets with no active market
      - a) CMO's, ABS's and CBO's.
      - b) Wholly owned subsidiaries.
      - c) Thinly traded assets.
    - ii. Assets undervalued can also be a problem.
  - b. Ways to reduce this risk
    - i. Invest the great majority of funds in assets with readily available and verifiable market values.
    - ii. Ensure that controls exist so that value of these assets is determined independently.
    - iii. For a large investment in an affiliate, consider an IPO to establish independent market value.
4. Spread-Widening Risk
  - a. Spread widening is a function of supply and demand.
  - b. Most significant for lower quality, thinly traded and unusual securities.
  - c. A good example is Executive Life with junk bonds.
  - d. Ways to control this risk
    - i. Invest mainly in assets with a small such risk.
    - ii. Use assets with large such risk with products having MVA's.
    - iii. Limit these assets to a small % of total assets.
    - iv. Hold extra capital to withstand effect of spread widening.
5. Suboptimal Asset Allocation
  - a. Risk easy to manage by shifting a portion of investments to higher yielding, more volatile assets.
6. Currency Fluctuation Risk
  - a. Balance sheet risk when assets and liabilities are significantly out of balance by currency.
  - b. Can be managed by balancing assets and liabilities by currency.
  - c. Income statement risk when income, benefits and expenses are significantly out of balance by currency.
  - d. Could be managed by buying currency hedges, but most companies do not.

## B. Credit Risk

1. Asset Default Risk
  - a. Excessive defaults from prolonged poor economic conditions or poor asset allocation.
  - b. Ways to manage it
    - i. Share risk with policyowners through MVA's and variable products.
    - ii. Invest mainly in investment-grade assets.
    - iii. Limit investments that are below grade to small % of total assets.
    - iv. Hold extra capital to withstand effect of excessive asset defaults.
2. Concentration Risk
  - a. Risk associated with having a large portion of investments concentrated in a particular issuer, sector, industry, part of the country or part of the world.

- b. Examples include Mutual Benefit Life, New England Mutual and Confederation Life.
  - c. Can be controlled by adopting and following a strict policy of diversification of risk.
3. Risk of Inadequate Spreads
- a. Risk that credit-related spreads of issuers, sectors, countries or classes of assets may not appropriately compensate investor for credit risk assumed.
  - b. Smaller where reliable information over a long period is available.
  - c. Controlled by limiting % of assets invested in newer and less familiar issuers, sectors, etc.
4. Counterparty Risk
- a. Risk that other parties will not fulfill their obligations to company.
  - b. Can be controlled
    - i. By dealing only with high-quality business partners.
    - ii. By diversifying or spreading risk among multiple partners.
- C. Liquidity Risk
1. “Run-on-the-Bank” Risk
- a. Risk that ratings downgrade or adverse publicity could cause policyowners to simultaneously demand cash from company.
  - b. Examples include General American, Kentucky Central and Baldwin United.
  - c. Other factors include stock market crash or rapid rise in interest rates.
  - d. Strategies for dealing with the risk
    - i. When designing contracts, give company option to delay payments.
    - ii. Avoid “hot money” products.
    - iii. Maintain some % of portfolio in highly liquid assets.
    - iv. Establish credit facilities that allow company to raise cash rapidly.
2. Holding Company Liquidity Risk
- a. Holding company needs cash to
    - i. Pay stockholder dividends.
    - ii. Pay interest on debt.
    - iii. Cover expenses.
    - iv. Invest in subsidiaries.
    - v. Repurchase stock
    - vi. Repay debt principal.
  - b. Only regular source is dividends from subsidiaries.
  - c. Other source is capital markets.
  - d. Best managed by planning well ahead.
3. Risk of Excessive Liquidity
- a. To counter it, determine optimal level of liquidity.



## D. Pricing Risk

### 1. Mortality Risk

- a. Epidemics have decimated populations.
- b. Bacteria and viruses can mutate very fast.
- c. Natural and manmade disasters can kill a lot of people.
- d. Mortality can be affected by selective lapsation.
- e. Measures include holding extra capital or using reinsurance.

### 2. Morbidity Risk

- a. Epidemics and disasters.
- b. Ability of insured to outwit company.
- c. Successfully controlled through
  - i. Careful underwriting.
  - ii. Clear and verifiable benefit provisions.
  - iii. Diligent handling of claims.
  - iv. Designing benefits that encourage beneficial behavior.

### 3. Longevity Risk

- a. For income annuities.
- b. To control this risk, allow greater mortality improvement when pricing.
- c. Attractively priced reinsurance can be hard to find.

### 4. Pricing Assumption Risk

- a. When dealing with new markets, new products, new underwriting standards or new distribution system.
- b. When pricing using projected lower unit costs.
- c. To reduce it
  - i. Reinsure business that has worrisome levels of pricing risk.
  - ii. Work with pricing experts to develop assumptions that reflect the latest information and techniques available.

### 5. Liability Option Risk

- a. Lack of ability to properly price options given to policyowners.
- b. To manage this risk
  - i. Greater level of awareness of existence and cost of such options.
  - ii. Use reinsurance.
  - iii. Avoid too large a concentration of option risk.

## V. Earnings Management

### A. Goals

1. To grow earnings over time, usually at a targeted growth rate.
2. To minimize unexpected fluctuations.

### B. Product Management

1. Combination of 2 things
  - a. Managing in-force products.
  - b. Design and introduction of new products.

2. Management of In Force Business
    - a. Dividends, nonguaranteed premiums, credited interest rates and COI rates can be changed.
    - b. Considerations
      - i. Delivering on promises.
      - ii. Equity among policyowners.
      - iii. Effect on persistency.
      - iv. Regulatory restrictions.
  3. Pricing of new products is most important tool company has to drive future earnings.
- C. Asset Management
1. Investment strategies can be changed over time.
  2. Improve yield or reduce volatility.
  3. Matching assets and liabilities.
  4. One disadvantage of investments in real estate and common stocks is that capital gains are essentially ignored by stock markets.
  5. Operating earnings are total earnings less capital gains.
- D. Expense Management
1. Introduction
    - a. Important part of earnings management.
    - b. When managing expenses, it is crucial to understand what really matters to your customers and distribution system.
  2. Major Expense Reductions
    - a. Across-the-board cut technique may backfire.
    - b. Surgical incisions done in rational, nonpolitical manner can be successful.
    - c. Look at company as if you were a corporate raider.
    - d. Look at company as if it was a new, start-up company.
  3. Minor Expense Reductions
    - a. Analyze jobs and derive value each job adds to company.
    - b. Pursue outsourcing when costs are lower.
    - c. Reengineer processes.
    - d. Restructure or reorganize all or part of company.
    - e. Identify ways that company culture can be shifted to improve collaboration, communication, etc.
  4. Allocation of Corporate Expenses
    - a. Corporate expenses should be segregated in a corporate line of business.
    - b. Expenses that would be eliminated or replaced if company were to be merged.
    - c. Should not be allocated.
  5. Legacy Systems
    - a. Heart and soul of many companies.
    - b. To replace them is unimaginably difficult task.
    - c. To continue them becomes increasingly complex and expensive.
    - d. One solution is to adopt modern system for all new business, while building bridges to import data as needed from old systems.

## VI. Capital Management

### A. Determining the Proper Amount of Capital

1. Considerations
  - a. Insurance regulations specify minimum amount of capital required.
  - b. Rating agencies rate the financial strength or claims-paying ability of companies.
  - c. Companies often strive to have capital in line with their primary competitors.

### B. Determining the Proper Capital Structure

1. Introduction
  - a. For stock companies, sources are debt, equity and reinsurance.
  - b. For mutual companies, source is reinsurance.
2. Corporate Structure
  - a. Parent company can issue debt that becomes equity to insurance co.
  - b. May have multiple companies
    - i. To operate in different countries.
    - ii. To operate in different markets.
    - iii. For historical reasons, such as acquisitions.
3. Equity
  - a. Largest component of capital.
  - b. Owners' capital plus retained earnings.
  - c. Capital with highest risk.
  - d. Forms include common and preferred stocks.
  - e. Both normally pay dividends.
4. Debt
  - a. Low-risk capital.
  - b. In many countries, interest paid on debt is tax deductible.
  - c. Lower rate of return.
  - d. Debt is simply another form of liability.
  - e. Forms of debt are bond debt and bank debt (bank loan).
  - f. Bank debt is usually short term.
  - g. Cost of borrowing increases as company increases % of capital in the form of debt.
  - h. Weighted average cost of capital (WACC)
    - i. 
$$\text{WACC} = \% \text{ of capital in equity} \times \text{Desired return on equity} +$$
$$\% \text{ of capital in debt} \times \text{After-tax cost of debt.}$$
    - ii. WACC may be used as basis for hurdle rate, if company has long-range target ratio of debt and equity.
5. Combinations of Debt and Equity
  - a. Mezzanine financing.
  - b. Types include convertible bonds and surplus notes.
  - c. Convertible bond pays lower rate of interest and is convertible to common stock at attractive price in few years.
  - d. Agencies might view convertible bond as more equity than debt.
  - e. Surplus notes are like bonds except that coupon and maturity payments are subject to ongoing approval by regulators.
  - f. Surplus notes are treated as equity for solvency purposes.
  - g. Rating agencies may view surplus notes as more debt than equity.

6. Reinsurance
  - a. Favorable attributes include
    - i. Transfer of risk as well as capital.
    - ii. Reduction in need for outside capital.
    - iii. Access to capital as needed.

### C. Methods of Raising Capital

1. Sources of Capital for Mutual Companies
  - a. At the origin
    - i. Original policyowners provide capital needed to start the company, or
    - ii. If formed through mutualization, capital remaining after stockholders were bought.
  - b. Afterward, only through retained earnings.
  - c. Mutual companies have 2 levers to keep actual capital in line with required capital
    - i. They can carefully manage their growth so that capital needs do not outstrip growth in capital.
    - ii. They can manage dividends so that existing policyowners provide additional capital needed to finance new policyowners.
2. Sources of Capital for All Companies
  - a. Reinsurance.
  - b. Surplus notes.
  - c. Sale of all or part of one of businesses.
3. Sources of Capital for Stock Companies
  - a. Debt
    - i. Easier form.
    - ii. The greater the financial strength, the lower the interest rate.
    - iii. Financed by selling bonds to public, privately or by bank debt.
  - b. Equity
    - i. Can be problematic.
    - ii. Need to satisfy existing stockholders and new investors.
    - iii. Existing stockholders may object because it dilutes their ownership.
    - iv. Offering will lower EPS for a time.
    - v. New investors must regard company or stock price as attractive.
    - vi. Companies can fall into a vicious or virtuous cycle of capital raising.

### D. Methods of Deploying Excess Capital

1. Distributing Excess Capital to Owners
  - a. Pay a one-time special dividend to stockholders.
  - b. Increase regular dividends to pay excess over longer period.
  - c. Buy back shares of company to raise price of shares.
  - d. If company is a mutual, enhance benefits paid to policyowners
    - i. Increase dividends.
    - ii. Enhance credited interest rates.
    - iii. Lower COI rates.

2. Deploying Excess Capital into Current Operations
  - a. Questions you might ask
    - i. Should new, more capital-intensive products be developed?
    - ii. Should existing products be repriced?
    - iii. Should distribution capabilities be expanded?
    - iv. Should company undertake significant projects to improve productivity or service capabilities?
3. Deploying Excess Capital into New Operations
  - a. Start up new line of business.
  - b. Enter a new market.
  - c. Build new distribution system.
  - d. Pursue an acquisition.

#### E. Internal Capital Management

1. Historical Method
  - a. Tracks results for business from inception, accumulating actual cash flows and ignoring capital requirements.
  - b. Negative capital in early years.
  - c. Ignores reality that every business must maintain some amount of required capital.
  - d. ROE is grossly misstated because earnings and equity are distorted.
2. Required Capital Method
  - a. Allocates amount of capital required to support business.
  - b. Actual earnings are determined using logic consistent with distributable earnings.
  - c. Results are not distorted by historical results.
  - d. Requires that company keep accurate records of capital contributions to and distributions from each business.
3. Value at Risk (VaR)
  - a. Required capital has 2 components
    - i. Portion truly at risk.
    - ii. Portion required to satisfy redundant regulatory reserves or excessive capital requirements.
  - b. VaR involves a 2-tier approach to calculate required capital for each business
    - i. Tier 1 is high-risk to withstand adverse experience (VaR).
    - ii. Tier 2 is low-risk equal to additional capital needed to maintain financial ratings.
  - c. A Tier 3 exists at company level equal to excess or shortage of capital and is not allocated.
  - d. Ideally Tier 1 should be backed by equity and Tier 2 by debt.

4. Using VaR to Allocate Cost of Capital
  - a. Calculate WACC.
  - b. Allocate assets backing reserves and Tier 1 required capital to business units.
  - c. Retain assets backing Tier 2 required capital in unallocated corporate segment and allocate a charge for it to business units.
  - d. Retain assets backing Tier 3 capital in separate unallocated corporate segment but allocate no charge for it to business units.
  - e.  $ROE = \frac{\text{After-tax Business Unit Net Income} - \text{Charge for Tier 2 RC}}{\text{Tier 1 RC}}$ .
  - f. Expect each business unit to earn company's targeted ROE.
  - g. Calculate charge for Tier 2 RC as a % of Tier 2 RC so that company will achieve targeted ROE if all business units achieve targeted ROE.
5. Allocation of Excess or Shortage of Capital
  - a. If temporary, should be allocated to a corporate segment.
  - b. If permanent, calculation of required capital should be revised to reflect this view.
  - c. Other approach is to allocate all capital in proportion to required capital for each business
    - i. No excess or shortfall.
    - ii. Can magnify flaws in required capital calculations.
  - d. Results can be distorted by reinsurance.
6. Rationing of Capital
  - a. Difficult choices when capital is short.
  - b. Over the long term, most companies will grow their most profitable businesses and shrink or curtail their least profitable businesses.

## VII. Achieving Financial Goals

### A. Basic Requirements

1. Competitive advantages.
2. Serve markets that provide opportunities for desirable profits and growth.
3. Many areas of company must work in concert.
4. Balance between growth, profitability + risk to match availability of capital

### B. Financial Management Techniques

1. Better to underpromise and overdeliver.
2. Make modestly conservative accounting and reserving choices so that chances of negative surprises are reduced.
3. Increase vigilance when times are good.
4. Timing is important.
5. Have a bias toward opportunities with more upside than downside potential.
6. Builds speed in the organization.

### C. Achieving Financial Goals for Mutual Policyowners

1. Mutual policyowners want financial security and maximum value.
2. Accomplished by continuing to grow company at pace dictated by
  - a. Capital.
  - b. Acquisition costs.
  - c. Rates of return on new business.

### D. Demutualization

1. Mutuals return much of value through dividends.
2. Mutuals have lower ROI and ROE.
3. Upon demutualization, company starts stock life with very low ROE, because mutual block depresses it for years to come.
4. Companies often use IPO to raise additional capital.

### E. Achieving Stockholder Financial Goals

1. Stockholders want stock price appreciation and dividends.
2. Stock price is driven by 2 factors
  - a. Outlook for company and industry.
  - b. Recent history of company under current management team.
3. Stock prices are largely a function of P/E ratios.

4. P/E ratios are largely a function of expected growth rate for company.
5. Insurance companies P/E ratios tend to be below average.
6. Dividends have diminished in importance over time.
7. Investors focus almost all of their attention on stockholder reporting and scant attention on regulatory or solvency reporting.
8. Company should modify financial goals over time.

#### F. Embedded Value

1. PV of distributable earnings including any current excess capital.
2. Value from future new business is not included.
3. Represents a run-off value discounted at a given rate of return.
4. May become a key driver for the following reasons
  - a. Used extensively in Europe, it should become the prominent valuation basis for life insurers.
  - b. Actuarial valuation tool used by buyers to substantiate take-over prices, since buyers look at value of target in 3 pieces
    - i. Embedded value.
    - ii. Goodwill.
    - iii. Multiple of potential annual cost savings.
  - c. Allows investors to see how much of company's current value is represented by in-force business and how much is based on expected future growth.
  - d. Good test of recoverability of life insurance intangibles.
  - e. Should at least provide a minimum value for life insurance companies.
5. Can be time- and staff-consuming to implement and maintain.
6. Can be sensitive and change significantly with assumption change.
7. Can be difficult to explain to management and outside analysts.





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**MARKET VALUE MARGINS FOR INSURANCE LIABILITIES IN FINANCIAL**  
**REPORTING AND SOLVENCY APPLICATIONS, OCTOBER 1, 2007**  
**(THROUGH PAGE 65)**

I. Executive Summary

A. Introduction

1. This report examines the cost of capital method in 2 specific contexts
  - a. Measuring the fair value of insurance liabilities for financial reporting purposes.
  - b. Establishing regulatory capital standards for insurers.

B. Overview of the Cost of Capital Method - Inputs required for the calculation

1. Initial Capital Base.
2. Capital Base in Each Subsequent Period Over the Lifetime of the Liability.
3. Cost of Capital Rate per Period.

C. Major Findings

1. Key parameters used in the cost of capital methodology and in pricing practices should be reconcilable.
2. Pragmatic approaches to quantifying risk must be validated.
3. Cost of capital rate must be calibrated.

D. Implications

1. Financial reporting: Fair value estimates should at all times reflect current market environment with respect to assessment of risk and market price for transfer of this risk.
2. Solvency Applications: Same implications apply plus unique challenges.

E. Conclusions

1. Comparison and analysis of relationship of ultimate and one-year risk exposure horizons for insurance risk to capital standards in common use.
2. Review of common pricing methods currently in use.
3. Analysis of investor return expectations and underlying capitalization levels inherent in such expectations.
4. Review of existing literature on application of CAPM, the Fama-French 3-Factor Model and other means of establishing equity returns expected by investors.
5. Development of estimates of factors that may impact appropriate cost of capital rate.
6. Review of capital market transactions to determine implied cost of capital rate as well as potential change in this rate following a market shock or distress scenario.
7. Recognizing on-going debate over appropriateness of using entry prices for calibrating fair value estimates.

## II. Introduction

### A. Scope of Report

1. Establishing the fair value of insurance liabilities for financial reporting purposes.
2. Establishing regulatory capital standards for insurers.

### B. Outline of Report

1. Role of risk margins for financial reporting applications.
2. Overview of cost of capital method.
3. Challenges that industry faces.
4. Importance of ability to properly calibrate risk margins.

### C. Additional Considerations

1. Various issues regarding determination of cash flows to be included in liability estimates for financial reporting purposes.
2. Appropriateness of standardized rather than company-specific risk margins for financial reporting.
3. Procedure to ensure consistency between internal models and standard formulas.
4. Appropriateness of one-year solvency time horizon for setting total capital requirements on long-term insurance risks.
5. Components of capital requirements under certain proposed solvency frameworks.

## III. Market Value Margins for Financial Reporting

### A. Fair Value Financial Reporting Framework

1. Three components of fair value of insurance liability
  - a. Best Estimate Liability (BEL).
  - b. Market Value Margin (MVM).
  - c. Profit Margin.
2. Separation of the BEL and the MVM
  - a. BEL may include portion of risk margin attributable to hedgeable risks.
  - b. MVM reflects only additional risk margin required for non-hedgeable risks.
3. Calculating the MVM for Financial Reporting Using the Cost of Capital Method
  - a. Determine Capital Base.
  - b. Determine Time Horizon for Capital Commitment.
  - c. Determine the Required Rate of Return on Capital per Period.

#### IV. Initial Capital Base

##### A. Link Between the Amount of Capital and the Annual Cost of Capital

1. Amount of capital is linked to its cost as a rate per period.
2. For the same BEL a lower amount of capital held should be used along with a higher rate per period.

##### B. Basis for Initial Capital Base

1. Regulatory Required Capital.
2. Rating Agency Target Capital.
3. Internal Capital Models: Challenges include
  - a. Implementation Requirements.
  - b. Validation.
  - c. Adjustments to the Annual Cost of Capital Rate.

##### C. Risk Exposure Horizon

1. Definition of Risk Exposure Horizon
  - a. Regulatory capital models: capital must cover ultimate liabilities.
  - b. Various existing and proposed frameworks: One-year horizon.
2. Ultimate Risk Exposure Horizon Example.
3. One-Year Risk Exposure Horizon Example.
4. Two Alternative Perspectives on Risk Exposure Horizon
  - a. Ultimate risk perspective is that the party assuming risk must be adequately capitalized from inception.
  - b. One-year risk perspective assumes that capital can be raised sequentially to fund a series of one-year risks.
5. Determining Capital Base Using Ultimate Risk Exposure Horizon – Effects through time
  - a. Exposure declines because number of lives declines.
  - b. Potential variability declines over time because of fewer periods left.
  - c. Impact of decreased variability is dampened by elimination of diversification benefits
  - d. Capital base reflects less discounting for time value of money.
6. Determining Capital Base Using One-Year Risk Exposure Horizon.
7. Applying the Cost of Capital Method
  - a. Either perspective could be used mechanically to derive MVM.
  - b. Cost of capital rate per period must be adjusted to produce same MVM.
8. Comparison to Existing Pricing Practices
  - a. Market will provide only one fair value liability price point.
  - b. Many existing internal capital models use ultimate approach.

- D. Measuring Capital Base for Non-hedgeable Risks: More practical stress testing performed.
- E. Diversification Adjustments: Definition of reference entity is particularly important.

## V. Time Horizon for Capital Commitment

### A. Approximating the Capital Base Over Time

- 1. P&C Product Applications
  - a. Capital Base Over Time Using Ultimate Risk Exposure Horizon
  - b. Ways to model the release of initial capital base over time
    - i. Proportional to Loss Reserve Release.
    - ii. Proportional to Establishment of Reserves.
    - iii. Implied by Rating Agency Capital Models.
  - c. Capital Base Over Time Using One-Year Risk Exposure Horizon
- 2. Life and Annuity Product Applications: Risk measure is not simply proportional.

### B. Impact of Diversification is a challenge.

## VI. Annual Cost of Capital

### A. Basis for Establishing the Cost of Capital Rate

- 1. Total Return vs. Spread
  - a. MVM has to provide for the spread over and above the risk free rate of return.
  - b. This quantity will be referred as the cost of capital rate.
- 2. Return Requirements of Capital Providers
  - a. Applicability of Shareholder Based Models.
    - i. Risk Definition.
    - ii. Returns for Run-Off/Closed Block.
  - b. Role of Corporate Debt and the Weighted Average Cost of Capital.
  - c. Frictional Costs.

### B. Impact of Corporate Income Taxes.

### C. Calibration to Market Prices

- 1. Calibration of Property Catastrophe Bond Spreads: Important observations
  - a. Implied cost of capital rate varies for each sample transaction.
  - b. Implied cost of capital rate changed significantly after the 2005 hurricane season.
  - c. Implied (post-Katrina) spreads are significantly in excess of placeholder rates now being used in certain solvency applications of the methodology.
- 2. Observable rates are Blended Rates for Hedgeable and Non-hedgeable Risks.

## VII. Considerations for Solvency Applications

### A. Capital Standards for Insurer Solvency

1. Objective of capital standard is to ensure that, under distress scenario, company could restate its liabilities to their fair value and have positive balance in its capital account.
2. To achieve objective, it is necessary to quantify
  - a. Current BEL =  $BEL_0$ .
  - b. Change in BEL = Solvency Capital Requirement for Non-Hedgeable Risks = CR
    - i. It reflects potential change in BEL over a one-year time horizon.
    - ii.  $BEL_0 + SCR = BEL^{DS}_1 =$  Distress scenario BEL.
  - c. Current MVM =  $MVM_0$ .
  - d. Change in MVM such that  $MVM_0 + \text{Change in MVM} = MVM^{DS}_1$ .
  - e. Difference between  $MVM^{DS}_1$  and  $MVM_0$  reflects combined effect of
    - i. Market Price per Unit of Risk Changes.
    - ii. Perceived Risk Changes in a Distress Scenario.
    - iii. Passage of Time Implies Less Remaining Risk.
3. Required Capital and the Change in Fair Value
  - a. Potential Change in Fair Value =  $FVL^{DS}_1 - FVL_0 = \Delta BEL + \Delta MVM$ .
4. Change in Net Assets.

### B. Implementation of Cost of Capital Method in Solvency Applications

1. Risk Exposure Horizon Used to Estimate the Change in the BEL (one-year).
2. Risk Exposure Horizon Used to Estimate the End of Period MVM
  - a. Even when MVM reflects ultimate risk exposure horizon, SCR must reflect one-year risk exposure horizon.
  - b. Care should be taken to ensure that approximation of future periods' capital base accurately reflects risks in each period.
3. Appropriate Assumptions for Calculating the MVM in a Distress Scenario
  - a. Intent is to capture risk margin that would be appropriate after a distress event.
  - b. MVM must be conditional upon extreme change in BEL occurring during period.
4. Appropriate Assumptions for Calculating the End of Period MVM.

## VIII. Benchmarking Results - Considerations

### A. Using Entry Prices to Calibrate Exit Prices

1. Impact of Portfolio Effects and Diversification: Entry prices often reflect value of policy to individual insured.
2. Change in Valuation Over Time.

3. Exit prices are only meaningful when each of the following is true
  - a. They can be calculated consistently across different insurers and different products.
  - b. They can be calibrated against objective benchmarks reflecting actual prices at which risks associated with insurance liabilities are transferred in arms-length transactions.
  - c. They rely upon parameters and assumptions that can capture both the current market environment for financial reporting purposes and capture the potential future market environment in a distress scenario for solvency purposes.
- B. Availability and Granularity of Benchmark Prices – Options that can be considered
  1. Primary or Reinsurance Market Premiums with following limitations
    - a. Diversity.
    - b. Transparency.
    - c. Aggregation of BEL and MVM.
    - d. Magnitude.
  2. Loss Portfolio Transfers and Closed Block Transactions.
  3. M&A Transaction Prices with following limitations
    - a. These transactions involve diversified portfolios of insurance risks.
    - b. A significant component of price paid reflects company's franchise value.
- C. Challenges Associated with Capturing Current Market Conditions
  1. Include Practicality and Usability.
  2. Solvency context requires forward-looking assessment of market conditions.

## IX. Appendix A: Percentile Method

- A. Description
  1. It uses underlying risk distribution to directly determine aggregate fair value of liability as specified percentile of distribution.
  2. Subtracting BEL from amount allows determination of MVM.
- B. Comparison to Cost of Capital Method
  1. Cost of Capital Method Makes the Underlying Assumptions Explicit.
  2. Percentile Method requires complete risk distributions.
  3. Several challenging aspects of the Cost of Capital Method are still relevant.
  4. Calibration and Validation Challenges are not resolved.

## X. Appendix B: Introduction to Cost of Capital Method – P&C Liability Application

- A. Results depend entirely upon 3 key elements
  - 1. Amount of initial capital base.
  - 2. Time horizon over which that capital must be committed.
  - 3. Required rate of return on capital per period.

## XI. Appendix C: SPDA Example

- A. Risk in this product is driven by following components
  - 1. Crediting Rate Guarantees.
  - 2. Lapse Rate Variability.
  - 3. Investment Strategy.
- B. Risk Modeling Assumptions
  - 1. Product annuitization exercisable 10 years from inception.
  - 2. In-force of 1,000 policyholders with initial balance of 100,000.
  - 3. Crediting rate = reference rate – fixed spread, subject to guaranteed minimum.
  - 4. Lapse rate = base rate + dynamic lapse rate + random lapse rate.
  - 5. No mortality within 10 years.
  - 6. No surrender charges.
  - 7. Expenses are .25% of account value.
  - 8. Stochastic Rate Model.
- C. Calculation of BEL using methods to price interest rate derivative securities.
- D. Calculation of the Capital Base for Non-Hedgeable Risks
  - 1. Full Stochastic Simulation and the Double-Counting of Risk.
  - 2. Using the Forward Rate Path.
  - 3. Adverse Rate Path.
  - 4. Lapse Rate Shock Scenarios.
- E. Comparison of MVM Calculations.



## XII. Appendix D: P&C General Liability Risk

- A. Assumptions.
- B.  $BEL = PV$  of expected claim payments.
- C. MVM for Financial Reporting
  - 1. Ultimate Risk Exposure Horizon: Assumes portfolio is assessed on a stand-alone basis.
  - 2. One-Year Risk Exposure Horizon.
- D. MVM for Solvency Applications.

## XIII. Appendix E: Approximating the Capital Base Over Time

- A. To demonstrate potential inaccuracy of approximating capital base in future periods using a one-year risk exposure horizon and applying a constant ratio to reserve balances.
- B. Commercial auto liability data.
- C. Estimated Reserves and Their Variability.
- D. Best Estimate Loss Reserve Variability Over “One Year”.
- E. Relationship Between the Sequence of One-Year Variability Measures.
- F. Relationship Between the Sequence of Capital Measures.
- G. Other Lines of Business.

**Source: Atkinson-Dallas, Chapter 16, Financial Management****Question 1**

(83 Points)

Describe the various components of:

- (a) Market risk
- (b) Credit risk
- (c) Pricing risk

**Source: Atkinson-Dallas, Chapter 16, Financial Management****Question 2**

(18 Points)

With respect to the Purchase Value of an In-Force Block of business, you are given the following information:

Embedded value,  $EV(0) = \$5,000,000$

SolvRes  $(0) = \$10,000,000$

TaxRes  $(0) = \$7,500,000$

ReqCap  $(0) = \$2,000,000$

Tax  $(0) = \$400,000$

TransCosts =  $\$1,000,000$

- (a) Determine the minimum assets at time 0.
- (b) Determine the Purchase Value at time 0.

**Source: Herget, Chapter 3, Expenses and Capitalization****Question 1**

(44 Points)

- (a) With respect to US GAAP for life insurers, describe the determination of the deferability of acquisition costs.

**Source: Herget, Chapter 4, Traditional Life Insurance (SFAS 60 & SFAS 97)****Question 1**

(42 Points)

According to SFAS 60 and SFAS 97, describe the following:

- (a) Benefit reserve methodology.
- (b) Expense recognition.
- (c) Provision for Adverse Deviations (PAD).

**Source: Atkinson-Dallas, Chapter 16, Financial Management****Solution to Question 1**

(83 Points)

<b><u>Statement</u></b>	<b><u>Points</u></b>
<b>(a) Market Risk</b>	<b><u>31</u></b>
A. Interest Rate Risk	2
1. Changing rates on assets and liabilities.	1
2. Disintermediation risk.	2
3. Mismatching.	2
4. Accounting quirks.	1
B. Market Fluctuation Risk	3
1. Fluctuation in market value of common stocks and real estate.	3
C. Asset Valuation Risk	2
1. Overly aggressive valuation of assets with no active market such as	2
a. CMO's, ABS's and CBO's.	1
b. Wholly owned subsidiaries.	1
c. Thinly traded assets.	1
2. Assets undervalued can also be a problem.	1
D. Spread-Widening Risk	3
E. Sub optimal Asset Allocation	3
F. Currency Fluctuation Risk	3
<b>(b) Credit Risk</b>	<b><u>26</u></b>
A. Asset Default Risk	2
1. Excessive defaults from prolonged poor economic conditions or poor asset allocation.	4
B. Concentration Risk	2
1. Risk associated with having a large portion of investments concentrated in a particular issuer, sector, industry, part of the country or part of the world.	4

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C. Risk of Inadequate Spreads	2
1. Risk that credit-related spreads of issuers, sectors, countries or classes of assets may not appropriately compensate investor for credit risk assumed.	4
D. Counterparty Risk	2
1. Risk that other parties will not fulfill their obligations to company.	4
<b>(c) Pricing Risk</b>	<b><u>26</u></b>
A. Mortality Risk	2
1. Epidemics have decimated populations.	2
2. Natural and manmade disasters can kill a lot of people.	2
3. Mortality can be affected by selective lapsation.	1
B. Morbidity Risk	2
1. Epidemics and disasters.	2
C. Longevity Risk	3
D. Pricing Assumption Risk	2
1. When dealing with new markets, new products, new underwriting standards or new distribution system.	2
2. When pricing using projected lower unit costs.	2
E. Liability Option Risk	2
1. Lack of ability to properly price options given to policyowners.	4
<b>TOTAL POINTS</b>	<b><u>83</u></b>

**Source: Atkinson-Dallas, Chapter 16, Financial Management****Solution to Question 2**

(18 Points)

<b><u>Statement</u></b>	<b><u>Points</u></b>
<b>(a) Minimum Assets</b>	<b><u>9</u></b>
1. $\text{Assets (0)} = \text{SolvRes (0)} + \text{ReqCap (0)} + \text{Tax (0)} + \text{TransCosts} - \text{EV (0)}$	6
2. $\text{Assets (0)} = \$10,000,000 + \$2,000,000 + \$400,000 + \$1,000,000 - \$5,000,000$	2
3. $\text{Assets (0)} = \$8,400,000$	1
<b>(b) Purchase Value</b>	<b><u>9</u></b>
1. $\text{Purchase Value} = \text{EV (0)} - \text{Tax (0)} - \text{TransCosts} - \text{ReqCap (0)}$	6
2. $\text{Purchase Value} = \$5,000,000 - \$400,000 - \$1,000,000 - \$2,000,000$	2
3. $\text{Purchase Value} = \$1,600,000$	1
<b>TOTAL POINTS</b>	<b><u>18</u></b>



**Source: Herget, Chapter 3, Expenses and Capitalization****Solution to Question 1**

(44 Points)

<b><u>Statement</u></b>	<b><u>Points</u></b>
<b>(a) Determination of deferability of acquisition costs</b>	<b><u>44</u></b>
A. Commissions eligible for capitalization	1
1. Short-duration contracts: entire commission.	3
2. Long-duration contracts: excess of initial over ultimate level of commissions.	3
3. Renewal commissions in excess of ultimate level of commissions.	3
4. Consider commission advancing and chargeback practices.	1
5. Agent financing costs are often capitalized.	3
6. Trailer commissions are usually not capitalized.	3
B. Expenses Similar to Commissions	5
1. Volume bonuses, sales contests, sales conventions.	1
2. If based purely on new production, can be capitalized as incurred.	1
3. Persistency bonuses: facts and circumstances would govern in each case.	1
4. Commission overrides are treated as commissions.	1
5. Salaried sales forces: possible deferrable step-rated variable cost.	1
C. Home Office Expenses	5
1. Marketing and advertising: (1) generally not deferrable (2).	3
2. Most underwriting expenses (1) are deferrable.(2)	3
3. Most policy issue expenses(1) are deferrable (2).	3
4. Functions in certain services in support of policy issue function (1) are deferrable (2).	3
<b>TOTAL POINTS</b>	<b><u>44</u></b>