

VALUATION OF LIFE INSURANCE LIABILITIES

Establishing Reserves for Life Insurance Policies
and Annuity Contracts

Fourth Edition

Louis J. Lombardi, FSA, MAAA

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✧ PREFACE

The fourth edition of this book is being published at a time when valuations of individual life and annuity liabilities under statutory accounting principles are undergoing a significant shift from “formula-based” to “principle-based.” Given the complexity of the types of products sold by the life insurance industry, this is a necessary and important change. However, it is a complex undertaking and will require a significant amount of education and training. Part of this education is an understanding of the “old” and the “new” methods. This is a primary goal of this book.

Those of you who are familiar with the third edition will barely recognize the fourth edition. This is because the fourth edition has undergone a significant rewrite. Important changes are:

1. New chapters on the statutory annual statement, the valuation process, and risk-based capital and;
2. Extensive modification to the chapters covering universal life, deferred annuities and cash flow testing.

Equally important are Excel workbooks associated with chapters 4-11, chapter 13 and 16, contained on the ACTEX website in the “Product Supplements” section at www.ActexMadRiver.com. When reading these chapters, it may be helpful to have the Excel Workbook open to follow along with the text.

Your password to access these workbooks is VALUATION514. Please read carefully the copyright notice associated with these files.

First, I want to thank Phil Polkinghorn and Mark Tullis for suggesting me as the author of the fourth edition. As a practitioner, I found the previous editions extremely helpful and I hope that this fourth edition lives up to the standard they have set. Second, I want to thank Gail Hall for encouraging me to write the fourth edition and the significant amount of support she gave during the editing process. Third, I want to thank Richard May for writing the material on Canadian valuation. Finally, I want to thank the following reviewers, some of which provided very constructive comments: Bruce Bohlman, Andy Boyer, Byron Corner, Mike DuBois, John Engelhardt, Mike Hale, Mike Harrington, Ed Jarrett, Charlie Linn, Link Richardson, Lyle Semchyshyn, Keith Sharp, and Don Skokan.

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Louis J. Lombardi, FSA, MAAA
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✧ Table of Contents

CHAPTER 1 OVERVIEW OF VALUATION REQUIREMENTS

1.1	Introduction	1
1.2	Role of Reserves.....	1
1.3	Actuarial Assumptions	3
1.4	Accounting Principles	4
1.4.1	Statutory Accounting Principles	4
1.4.2	Generally Accepted Accounting Principles (GAAP)	4
1.4.3	International Accounting Standards (IAS)	5
1.4.4	Tax Basis Accounting	5
1.4.5	Fair Value Accounting	5
1.5	Types of Valuations	6
1.5.1	Statutory Valuations	6
1.5.2	GAAP Valuations.....	7
1.5.3	Tax Reserve Valuations.....	7
1.5.4	Gross Premium Valuations.....	8
1.5.5	Embedded Value	9
1.6	Effects of Statutory Valuation Requirements.....	9
1.6.1	Gross Premium Levels	10
1.6.2	Product Design	10
1.6.3	Federal Income Taxes	10
1.6.4	Dividends to Policyholders	10
1.6.5	Statutory Earnings	10
1.6.6	Important Indicators	10
1.7	Statutory Valuation Requirements in Canada	11
1.7.1	Insurance Companies Act.....	11
1.7.2	Standards of Practice for the Appointed Actuary.....	11
1.7.3	The Canadian Asset Liability Method.....	13
1.7.4	Minimum Continuing Capital and Surplus Requirements	14
1.7.5	Dynamic Capital Adequacy Testing.....	15
1.7.6	Joint Policy Statement.....	15
1.8	Statutory Valuation Requirements in the United States	16
1.8.1	SSAP No. 50	16
1.8.2	SSAP No. 51	17
1.8.3	Appendices A-820 and A-822	17
1.9	Exercises.....	19

CHAPTER 2 NAIC ANNUAL STATEMENT

2.1	Statutory Annual Statement.....	21
2.1.1	Primary Financial Statements.....	21
2.1.2	Primary Actuarial Schedules and Exhibits	21
2.1.3	Successive Equation	22
2.2	Balance Sheet	23
2.2.1	Assets	23
2.2.2	Liabilities and Surplus.....	24

2.3	Summary of Operations.....	24
2.4	Capital and Surplus Account.....	26
2.5	Cash Flow Statement.....	26
2.6	Analysis of Operations by Lines of Business	27
2.7	Analysis of Increase in Reserves During the Year.....	28
2.8	Exhibit 1 – Part 1: Premiums and Annuity Considerations.....	29
2.9	Exhibit 5 – Aggregate Reserve For Life Policies and Contracts.....	31
2.10	Exhibit 8 – Policy and Contract Claims	33
2.11	Exhibit of Life Insurance.....	33
2.12	Exhibit of Annuities	34
2.13	Exercises.....	36

CHAPTER 3 THE VALUATION PROCESS

3.1	Introduction	37
3.2	Valuation Systems	37
3.2.1	Policy Extract	38
3.2.2	Plan Description File.....	40
3.2.3	Calculation Modules.....	40
3.2.4	Valuation File.....	41
3.2.5	Reports	42
3.3	Financial Information Systems.....	43
3.3.1	Data Warehouse	43
3.3.2	Extract, Translate and Load Process	44
3.3.3	Analytical and Reporting Process	45
3.4	Testing, Controls and Analytical Procedures	48
3.4.1	Testing.....	48
3.4.2	Controls and Analytical Procedures	48
3.5	Exercises.....	50

CHAPTER 4 VALUATION ASSUMPTIONS

4.1	Product Classification.....	51
4.2	Valuation Standards	52
4.2.1	Standard Valuation Law	52
4.2.2	Actuarial Guidelines.....	52
4.3	Valuation Assumptions	53
4.3.1	Mortality Tables	53
4.3.2	Interest Rates	53
4.4	Dynamic Valuation Interest Rates.....	56
4.4.1	Dynamic Valuation Interest Rate Formula.....	56
4.4.2	Reference Rate	56
4.4.3	Product Classification.....	57
4.4.4	Guarantee Duration	57
4.4.5	Cash Settlement Options and Future Interest Guarantees	57
4.4.6	Plan Type.....	57
4.4.7	Issue Year versus Change in Fund	58
4.4.8	Example.....	59
4.5	Exercises.....	62

CHAPTER 5 VALUATION METHODOLOGIES AND APPROXIMATIONS

5.1	Valuation Methodologies	65
5.2	Notation.....	65
5.2.1	Key Dates	65
5.2.2	Time Periods	65
5.2.3	Symbols.....	66
5.2.4	Example.....	66
5.3	Common Methodologies	67
5.3.1	Net Level Premium Method (NLP).....	67
5.3.2	Example (continued)	69
5.3.3	Modified Reserves.....	70
5.3.4	Full Preliminary Term (FPT) Reserve Method	71
5.3.5	Example (continued)	72
5.3.6	Commissioners Reserve Valuation Method (CRVM).....	72
5.3.7	Example (continued)	73
5.3.8	Other Methods.....	74
5.4	Common Approximations	74
5.4.1	Terminal Reserves.....	74
5.4.2	Mean Reserves	74
5.4.3	Deferred Premiums.....	76
5.4.4	Mid-Terminal Reserves.....	76
5.4.5	Unearned Premium Liability	77
5.4.6	Example (continued)	78
5.4.7	Immediate Payment of Claims Reserve	78
5.4.8	Continuous Reserves	79
5.4.9	Expense Allowance under Continuous Assumptions.....	82
5.4.10	Nondeduction Reserve	82
5.4.11	Refund Reserve	83
5.5	Exercises.....	85

CHAPTER 6 WHOLE LIFE

6.1	Introduction	87
6.2	Product Classification.....	87
6.3	Example.....	87
6.4	Statutory Annual Statement.....	88
6.4.1	Exhibit 5	89
6.4.2	Exhibit 1	89
6.4.3	Analysis of Increase in Reserves During the Year.....	92
6.4.4	Analysis of Operations by Lines of Business.....	93
6.4.5	Cash Flow Statement.....	94
6.4.6	Capital and Surplus Account.....	95
6.4.7	Liability and Surplus Sections of the Balance Sheet.....	96
6.5	Policyholder Dividends	96
6.6	Exhibit 5G	97
6.6.1	Deficiency Reserves.....	97
6.6.2	Excess Cash Surrender Value.....	100
6.7	Exercises.....	101

CHAPTER 7 TERM LIFE INSURANCE

7.1	Introduction	103
7.2	Product Classification.....	103
	7.2.1 Yearly Renewable and Convertible Term	104
	7.2.2 <i>N</i> -Year Renewable and Convertible Term	104
	7.2.3 <i>N</i> -Year Level Premium Term.....	104
	7.2.4 <i>N</i> -Year Decreasing Term.....	104
	7.2.5 Graded Premium Whole Life	105
7.3	Valuation of Life Insurance Policies Model Regulation	105
	7.3.1 Contract Segmentation Method.....	108
	7.3.2 Segmented Net Premiums	109
	7.3.3 Segmented Reserves.....	112
	7.3.4 Unitary Reserves	113
	7.3.5 Basic Reserves.....	114
	7.3.6 Minimum Value	115
	7.3.7 Deficiency Reserves	116
	7.3.8 Exemptions.....	116
7.4	Exercises.....	117

CHAPTER 8 UNIVERSAL LIFE INSURANCE

8.1	Introduction	119
8.2	Product Classification.....	119
	8.2.1 Fund Value	120
	8.2.2 Premiums.....	121
	8.2.3 Death Benefit Options.....	121
8.3	Universal Life Insurance Model Regulation	122
	8.3.1 Example.....	124
	8.3.2 Guaranteed Maturity Values	125
	8.3.3 Current Values.....	125
	8.3.4 Guaranteed Values	127
	8.3.5 Net Level Premium Reserves	128
	8.3.6 Commissioners Minimum Valuation Reserve.....	130
	8.3.7 Successive Reserves	131
	8.3.8 Alternative Minimum Reserves.....	133
	8.3.9 Fixed Premium Universal Life.....	134
8.4	Secondary Guarantees	135
	8.4.1 Actuarial Guideline XXXVIII.....	135
	8.4.1.1 Example 7.....	135
8.5	Off-Anniversary Reserves and Other Minimum Reserve Requirements	136
	8.5.1 One-half Cost of Insurance Minimum Reserve.....	137
	8.5.2 Excess Cash Surrender Value.....	137
8.6	Guaranteed Maturity Premium Method.....	137
8.7	The California Universal Life Regulation.....	138
8.8	Minimum Versus Adequate Reserves	138
8.9	Exercises.....	140

CHAPTER 9 VARIABLE LIFE INSURANCE

9.1	Introduction	143
9.2	Product Classification.....	143
9.2.1	Fixed Premium Variable Life Insurance	144
9.2.2	Flexible Premium Variable Universal Life Insurance.....	146
9.2.3	Single Premium Variable Life Insurance	147
9.3	Valuation of Variable Life Insurance	147
9.3.1	Fixed Premium Variable Life Insurance	148
9.3.2	Flexible Premium Variable Universal Life Insurance.....	148
9.3.3	Separate Account Reserve.....	149
9.4	Minimum Death Benefit Guarantee (MDBG) Reserve.....	150
9.4.1	One-Year Term Method	152
9.4.2	Attained Age Level Reserve Method	152
9.4.3	Projection Assumptions.....	153

CHAPTER 10 DEFERRED ANNUITIES

10.1	Introduction	155
10.2	Product Classification.....	155
10.2.1	Insurance Features.....	156
10.2.2	Other Product Features.....	157
10.3	Commissioners Annuity Reserve Valuation Method	159
10.3.1	Basic Application of Commissioners Annuity Reserve Valuation Method.....	159
10.3.2	Simple Example	159
10.3.3	Valuation Assumptions	161
10.4	Benefit Streams	161
10.4.1	Integrated Benefit Streams	161
10.4.2	Incidence Rates	162
10.5	Determination of Valuation Interest Rates	162
10.5.1	Interest guarantee period	163
10.5.2	Plan Type.....	163
10.6	Examples	164
10.6.1	Single Premium Deferred Annuity.....	164
10.6.2	Benefit Streams	168
10.6.3	Present Value the Benefit Streams	171
10.6.4	Greatest Present Value	
10.6.5	Calendar Year Valuations	176
10.7	Continuous CARVM.....	180
10.8	Handling Certain Common Product Features.....	181
10.8.1	Nursing Home Waiver.....	181
10.8.2	Bailout Provisions	181
10.8.3	Purchase Rates More Favorable than Guarantees	181
10.8.4	Market Value Adjustments.....	181
10.8.5	Two Tiered Interest Credits.....	182
10.9	Change-in-Fund Valuation Basis	182
10.10	Fixed Premium Deferred Annuities.....	183
10.11	Flexible Premium Deferred Annuities.....	183
10.12	Variable Annuities.....	183

10.13	Actuarial Guidelines XXXIV	184
10.13.1	Example.....	185
10.13.2	Projected Unreduced Account Values.....	188
10.13.3	Base Benefit Streams.....	188
10.13.4	Projected Reduced Account Values	190
10.13.5	Projected Net Amount at Risk.....	192
10.13.6	Integrated Reserve	192
10.13.7	Separate Account Reserve.....	197
10.14	Actuarial Guideline XXXIX	198
10.15	Exercises.....	199

CHAPTER 11 IMMEDIATE ANNUITIES

11.1	Introduction	201
11.2	Product Classification.....	201
11.2.1	Fixed versus Variable Immediate Annuities	202
11.2.2	Supplementary Contracts	203
11.2.3	Structured Settlements.....	203
11.3	Valuation of Immediate Annuities	203
11.3.1	Valuation Assumptions	203
11.3.2	Valuation Methodology.....	204
11.3.3	Example.....	205
11.4	Exercises.....	207

CHAPTER 12 MISCELLANEOUS RESERVES

12.1	Introduction	209
12.2	Accidental Death Benefit	209
12.3	Disability Waiver of Premium Benefits	212
12.3.1	Active Life Reserves	212
12.3.2	Disabled Life Reserves.....	213
12.4	Payor Benefits	213
12.5	Surrender Values in Excess of Reserves	214
12.6	Last-to-Die Policies.....	214
12.6.1	Reserves for Traditional Policies	214
12.6.2	Reserves for Frasier-Type Policies.....	215

CHAPTER 13 CASH FLOW TESTING

13.1	Introduction	217
13.2	Cash Flow Testing.....	218
13.2.1	Definition	218
13.2.2	Scope	219
13.3	Cash Flow Testing Process.....	219
13.3.1	Extract Files.....	220
13.3.2	Description Files	223
13.3.3	Calculation Modules.....	223
13.3.4	Model Validation.....	225
13.3.5	Model Reports	226

13.4	Scenarios	226
13.4.1	Deterministic	226
13.4.2	Stochastic	227
13.4.3	Interest Rate Models.....	227
13.4.4	Investment Strategy	228
13.4.5	Policyholder Behavior.....	229
13.4.6	Nonguaranteed Elements Practices	230
13.4.7	Lapse Rates	230
13.5	Case Study.....	231
13.5.1	Lapse Rates	232
13.5.2	Model Cell.....	232
13.5.3	Scenarios	233
13.5.4	Asset File.....	234
13.5.5	Assumption.....	235
13.5.6	Calculation Modules.....	238
13.6	Exercises.....	248

CHAPTER 14 THE VALUATION ACTUARY IN CANADA

14.1	Introduction	249
14.2	Before 1978	249
14.3	1978 Canadian Method	249
14.4	Policy Premium Method (PPM).....	251
14.5	Canadian Asset Liability Method (CALM).....	252
14.5.1	Prescribed Scenario 1	253
14.5.2	Prescribed Scenario 2	253
14.5.3	Prescribed Scenario 3	253
14.5.4	Prescribed Scenario 4	253
14.5.5	Prescribed Scenario 5	253
14.5.6	Prescribed Scenario 6	254
14.5.7	Prescribed Scenario 7	254
14.6	Dynamic Capital Adequacy Testing (DCAT)	254
14.7	Miscellaneous Valuation Practices In Canada.....	255

CHAPTER 15 THE VALUATION ACTUARY IN THE UNITED STATES

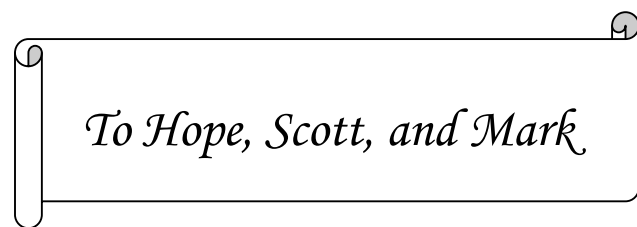
15.1	Introduction	257
15.2	Model Standard Valuation Law.....	257
15.2.1	General Requirement.....	258
15.2.2	Appointed Actuary	258
15.2.3	Actuarial Opinion of Reserves	258
15.2.4	Professional Liability	258
15.2.5	Supporting Memorandum.....	258
15.3	Actuarial Opinion and Memorandum Model Regulation.....	259
15.3.1	Actuarial Opinion Requirements.....	259
15.3.2	Actuarial Memorandum Requirements	259
15.4	Actuarial Standards of Practice No. 22	261
15.5	Required Analysis	262
15.5.1	Additional Analysis.....	262
15.5.2	Considerations	263

CHAPTER 16 RISK-BASED CAPITAL

16.1	Introduction	265
16.2	Goal of Risk-Based Capital	265
16.2.1	Insolvency Risk	266
16.2.2	Risk-Based Capital Defined	266
16.2.3	Target Surplus	266
16.3	RBC Formula	267
16.3.1	Asset Risk – Affiliates (C-0)	268
16.3.2	Asset Risk – Other(C-1)	268
16.3.3	Insurance Risk (C-2)	272
16.3.4	Interest Rate Risk, Health Risk and Market Risk (C-3)	272
16.3.5	Business Risk (C-4)	274
16.3.6	Other Risks	274
16.4	RBC Ratio	274
16.4.1	Calculation of Total Adjusted Capital	274
16.4.2	Covariance Adjustment	275
16.4.3	Regulatory Action Levels	275
16.5	Principle-based Risk-Based Capital	276
16.5.1	Cash Flow Testing for C-3 RBC (Phase I)	276
16.5.2	Cash Flow Testing for C-3 RBC (Phase II)	278
16.6	Example	280
16.7	Exercises	285

APPENDIX

A.1	Product Descriptions	287
A.1.1	Whole Life Contracts	287
A.1.2	Endowment Contracts	287
A.1.3	Term Life Contracts	287
A.1.4	Supplementary Contracts	287
A.1.5	Universal life and Variable Life Contracts	287
A.1.6	Limited-payment Contracts	288
A.1.7	Annuity Contracts	286
A.2	Living Benefits	288
A.2.1	Guaranteed Minimum Accumulation Benefits (GMAB)	289
A.2.2	Guaranteed Minimum Income Benefits (GMIB)	289
A.2.3	Guaranteed Minimum Withdrawal Benefits (GMWB)	289
A.2.4	Guaranteed Payout Annuity Floor (GPAF)	289
A.3	Minimum Death Benefit Guarantees	289
A.3.1	Return of premium	289
A.3.2	Reset	289
A.3.3	Roll-up	289
A.3.4	One-year ratchet	289
	Bibliography	291
	Index	293



To Hope, Scott, and Mark

1 ✧ Overview of VALUATION REQUIREMENTS

1.1 INTRODUCTION

At the end of 2004 approximately 167.7 million individual life insurance policies¹ were in force. The mortality tables used at the time most of these policies were sold assumed the insured would not live past his or her 100th birthday. Each year, several hundred of these insureds reach their 100th birthday. In some circumstances, the policies covering these insureds were issued over fifty years ago. This development illustrates three important facets of individual life insurance and annuity products. First, when the owners of these policies paid their first premium, the life insurance company that underwrote these risks and accepted the premium entered into a long term contractual commitment to pay certain benefits and provide certain services. Second, this relationship is based on events whose timing and occurrence are uncertain. Third, the long-term fiduciary responsibilities of the life insurance company have led to the development of specialized accounting and actuarial principles that involve a considerable degree of training, estimation and judgment.

Furthermore, a significant amount of the liabilities of a typical life insurance company are policy reserves. These liabilities are mostly devoted to the cost of future benefits and services. The magnitude of these reserves is such that a relatively small change in their unit value could significantly affect both the surplus and the earnings of the company in the period of the change. Consequently, the determination of these liabilities is among the more important actuarial functions of a life insurance company.

Reserves are liabilities for amounts an insurance company is obligated to pay in accordance with a life insurance policy or annuity contract². The amounts are usually uncertain as to the exact amount and the time of payment. Some reserves are held because the event insured against has already happened, but the amount of claim is not known by the insurance company since the claim has not yet been reported to the company, or insufficient information has been furnished. Most reserves are held because the event insured against has not yet happened, but the company is obligated to pay if the event does happen. The first category is often called **claim reserves** or **loss reserves**, and the latter is often called **policy reserves**.

This book primarily addresses policy reserves for life insurance policies and annuity contracts, including miscellaneous benefits that are often included in such policies. The term **actuarial reserves** is used in this book to refer to those policy reserves. Actuarial reserves are determined using an **actuarial valuation**.

1.2 ROLE OF RESERVES³

Most life insurance policies and annuity contracts are characterized by the payment of a level or single premium by the policy owner, even though the cost of the benefits and services is not level over the term of the

¹ 2006 Life Insurers Fact Book, Table 7.1 [7]

² In this book, policy and contract have the same meaning. Policy is typically used to identify a life insurance contract and contract is typically used to refer to an annuity contract.

³ Some of the concepts discussed in Section 1.2 and Section 1.3 reflect concepts addressed in Chapter 8 of the *AICPA Audit and Accounting Guide for Life and Health Insurance Entities* [8].

policy. This creates a timing problem that is often described as a mismatch between revenue and costs. For example, in the early years of a block⁴ of whole life policies, the premiums collected by the insurance company usually exceed the cost of benefits and services provided during those years. In contrast, the cost of benefits and services provided in the later years typically exceeds the premiums collected in those years. This relationship is demonstrated in Figure 1.1.

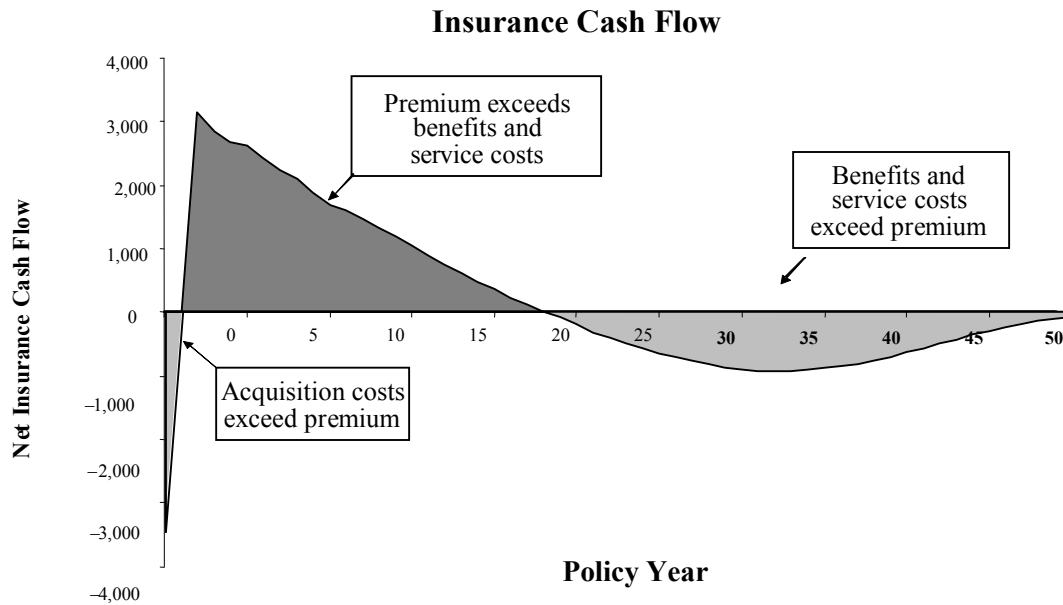


Figure 1.1

To properly match revenues and costs, reserves are established during the early policy years to provide for the excess cost of benefits and services over the corresponding premium in the later policy years.

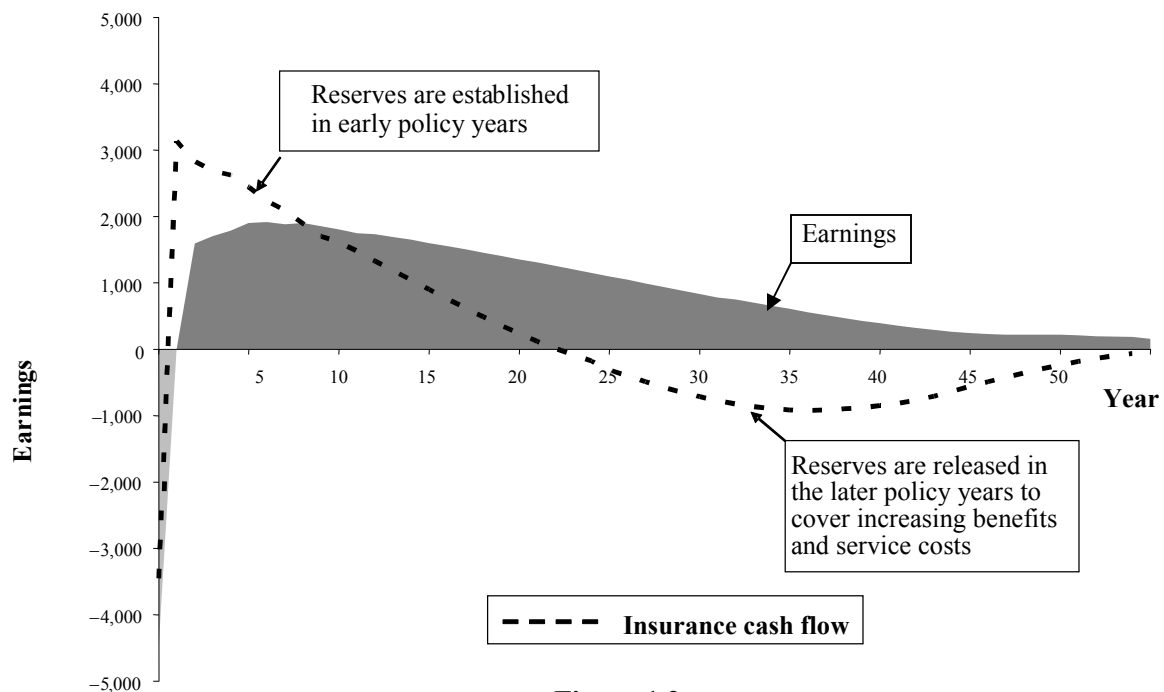


Figure 1.2

⁴ A block of policies will usually mean a fairly large number of policies issued in a particular calendar year with fairly homogeneous risk characteristics.

As the above graph in Figure 1.2 shows, the establishment of reserves in the early policy years causes earnings to be lower than on a cash or “pay as you go” basis. In the later policy years, the opposite relationship holds. In fact, cash shortfall is avoided as the invested assets held in support of the reserves are sold to provide for the amount by which the benefit payments and service costs exceed the premium collected plus the investment earnings on these assets.

1.3 ACTUARIAL ASSUMPTIONS

When a life insurance company enters into an insurance contract, it does not know precisely when the benefits and service costs will occur or how much they will be. Accordingly, the reserving process requires the use of various assumptions, estimates and judgments about the future. The primary assumptions are expenses, investment returns, mortality, morbidity, voluntary terminations (i.e., expiries, lapses, surrenders and withdrawals) and taxes. These assumptions are usually based on the company’s past experience, industry studies, regulatory requirements and judgments about the future, and are often called *actuarial assumptions*.

The actuarial assumptions used in the determination of policy reserves affect the timing of reported earnings. If the assumptions are too optimistic, earnings will be overstated in the early policy years and understated in the later policy years. Conversely, if the assumptions are unduly pessimistic, the opposite will occur.

Results of an actuarial valuation can vary widely, not only because of the legitimately wide range of possible assumptions, but also the purpose of the valuation. Thus, it is important for the actuary to have a thorough awareness of the customary valuation methodologies available and the context in which they are used.

Policy reserves are determined using financial modeling techniques that project revenue, benefits, and service costs over the term of the life insurance policy, which could be 100 years or more. The predictability of these projections depends on, among other factors, how well the assumptions and estimates represent actual experience in the future. Furthermore, these actual values are subject to a variety of internal influences (underwriting criteria, product features, and premium rates) that are under the control of the life insurance company, and external influences (competitive, demographic, economic, political, and social) that are beyond the control of the life insurance company. In addition, it is the nature of these values, especially over the long projection period used in an actuarial valuation, to be inherently volatile, and random fluctuations will occur that will affect the predictability of these projections. Accordingly, what may initially have been thought to be conservative may ultimately prove to have been too optimistic or too pessimistic (e.g., assuming everyone dies by age 100).

Finally, since reserves are calculated using probabilities of future events (for example, the probability that a male age 35 will die between the ages 45 and 46), they are subject to the Law of Large Numbers. In particular, reserves have true significance only for blocks (or groups) of policies. Although as a practical matter, a reserve may be calculated for an individual policy, resulting in a real liability to the insurance company, the theory behind reserves only holds for a large number of policies, and not at the individual policy level.

In addition, many life insurance and annuity products are exposed to market risk. This type of risk is often not possible to eliminate through diversification.⁵

⁵ Mortality is an example of a diversifiable risk. A variable product with guarantees is exposed to market risk and is an example of a non-diversifiable risk (i.e., selling a large number of these type of policies does not reduce the risk).

1.4 ACCOUNTING PRINCIPLES

Financial statements provide information to a variety of users who often have very different uses for this information. For example, insurance regulators, who represent the interests of policyholders, are concerned with the ability of the life insurance company to honor its commitments in accordance with the terms of the life insurance policy or annuity contract. Shareholders of stock life insurance companies, on the other hand, are more interested in understanding the earnings of the life insurance company and its growth prospects. Regulators and shareholders are important users of financial statements, but their interests are significantly different. Accordingly, different accounting principles have been developed to serve the needs of these different groups.

1.4.1 STATUTORY ACCOUNTING PRINCIPLES

Statutory accounting principles (SAP) are the principles prescribed or permitted by the insurance laws and regulations of the state or country in which the insurance company is incorporated⁶. The primary reason for preparing financial statements in accordance with statutory accounting principles is to help insurance regulators assess the ability of the life insurance company to satisfy their contractual obligations to policyholders. In other words, the emphasis is on **solvency**. With this emphasis on solvency, the primary focus of statutory financial statements centers on the balance sheet – in particular, the level of statutory capital and surplus⁷.

In the United States, statutory accounting principles can vary from state to state. Although there is a desire to minimize these variations and variations have been reduced in recent years, differences do exist. The **National Association of Insurance Commissioners (NAIC)** assists the state insurance officials with the development and maintenance of statutory accounting principles. One of the objectives of the NAIC is to provide a standard against which exceptions will be measured and disclosed⁸.

1.4.2 GENERALLY ACCEPTED ACCOUNTING PRINCIPLES (GAAP)

When a company issues securities on a United States exchange (e.g., New York Stock Exchange) it must prepare a registration statement for approval with the Securities and Exchange Commission (SEC). This statement must include financial statements prepared in accordance with **generally accepted accounting principles (U.S. GAAP)**. The Financial Accounting Standards Board (FASB) is the primary accounting standards body responsible for establishing accounting standards under U.S. GAAP.

Financial statements prepared in accordance with generally accepted accounting principles have a more diverse group of interested users. Shareholders, bondholders, banks and rating agencies are examples of users interested in financial statements prepared in accordance with GAAP. Although these groups have different needs, they share a common interest in understanding the earnings of the life insurance company. Accordingly, under generally accepted accounting principles, the emphasis switches to the matching of current revenue with current costs⁹. Large initial expenses are, therefore, generally deferred and amortized over the expected life of the block of policies. With this switch in emphasis, the income statement becomes the primary focus – in particular, the emergence of earnings of a block of business from accounting period to accounting period. Underlying this matching concept is the assumption that the life insurance company is a viable going concern.

⁶ The term, **domestic life insurance companies**, refers to the life insurance companies incorporated in a particular state within the United States.

⁷ Statutory capital and surplus is the amount of assets in excess of liabilities.

⁸ NAIC constitution [19].

⁹ With the adoption of several standards since the early 1990's, FASB began also placing increasing emphasis on the balance sheet.

1.4.3 INTERNATIONAL ACCOUNTING STANDARDS (IAS)

With the growth of financial markets around the world, there has been an increasing need to enhance the consistency of global financial reporting standards. The International Accounting Standards Board (IASB) is an international standards body based in London, England. The IASB mission is to develop a set of *International Accounting Standards (IAS)* that would require transparency and comparability in general purpose financial statements¹⁰.

Due to the importance of United States capital markets, a large number of multi-national companies have shares listed on one of the United States stock exchanges. Accordingly, they prepare one set of financial statements in accordance with U.S. GAAP and another set of financial statements in accordance with accepted accounting standards in the country where they are domiciled. The International Accounting Standards Board is working with the Securities and Exchange Commission and regulators in other countries to achieve a consistent set of accounting standards around the world. Their goal is for regulatory bodies of these countries to recognize statements prepared in accordance with International Accounting Standards to be in compliance with their local GAAP standards. If the IAS achieves this goal, multi-national companies would be able to avoid preparing financial statements under multiple general purpose accounting standards.

1.4.4 TAX BASIS ACCOUNTING

Generally, a life insurance company is taxed under the same federal income tax laws that are used to tax other taxable corporations. However, because of the unique accounting requirements of life insurance companies, there are sections of the Internal Revenue Code (IRC) that apply specially to life insurance companies.

In 1984, the United States Congress passed the Deficit Reduction Act of 1984 (DEFRA). Similar to regulations affecting other corporations, DEFRA defines the taxable income of a life insurance company as gross income less deductions. A significant deduction is the net annual increase in policy reserves. However, DEFRA requires that policy reserves, when used in the determination of taxable income, must be computed using federally prescribed standards. Policy reserves computed using such standards are called *Federally Prescribed Tax Reserves (FPTRs) or tax reserves*.

Another important piece of tax legislation was the Revenue Reconciliation Act of 1990. This Act also contained a provision that affected the determination of taxable income for a life insurance company. This provision is referred to as the DAC tax. Similar to GAAP principles, the concept was that certain expenses (for example, commissions and underwriting and issue expenses) should be deferred and amortized to produce a better matching of revenue with costs. The DAC tax significantly increased the taxable income of life insurance companies and, as a result, the amount of tax paid.

1.4.5 FAIR VALUE ACCOUNTING

In 1993, FASB adopted Statement of Financial Accounting Standards No. 115, *Accounting for Certain Investment in Debt and Equity Securities* (SFAS 115). The adoption of this standard resulted in a significant change in GAAP that had been under consideration by IAS and FASB since the early 1980s. SFAS 115 required that unrealized capital gains on certain assets be reported in the balance sheet as if they had been realized. This statement was a preliminary step toward fair value accounting.

Prior to SFAS 115, the balance sheet prepared in accordance with U.S. GAAP was primarily based on historical cost accounting principles. For example, if a bond was bought at a premium, the value of this bond was reported on the balance sheet at amortized cost. In other words, the premium was amortized in earnings from the date the bond was purchased to the maturity date of the bond. If the insurance company was to sell this

¹⁰ IASB mission statement [15].

bond before the maturity date, the **market value** would likely have been significantly different than the **book value** (the amount reported on the balance sheet). If interest rates had risen since the company bought the bond, the market value of the bond would probably have been lower than the book value, and the company would have reported a realized capital loss. Conversely, if interest rates had fallen since the company bought the bond, the market value of the bond would probably have been higher than the book value, and the company would have reported a realized capital gain.

Fair value accounting would report assets and liabilities at their fair value, which is defined “as the price at which an asset or liability could be exchanged in a current transaction between knowledgeable, unrelated willing parties.”¹¹ When an asset or liability actively trades on one of the exchanges, the fair value of this asset or liability would be the market price. When an asset does not actively trade on one of the exchanges, both FASB and IAS define a hierarchy of valuation methods for determining their value:

- (1) Market value when available;
- (2) Market value of similar instruments, with appropriate adjustment; and
- (3) Present value of projected cash flows.

The determination of the fair value of certain life insurance policies and annuity contracts are often based on the third method.

1.5 TYPES OF VALUATIONS

The methodology and assumptions underlying the determination of policy reserves depend upon whether the financial statements are being prepared in accordance with statutory accounting principles, generally accepted accounting principles (GAAP), tax basis accounting or other purposes. Accordingly, there are several different types of valuations.

1.5.1 STATUTORY VALUATIONS

Statutory valuations are performed to help insurance regulators assess the ability of the life insurance company to pay future benefits and service costs. Because the emphasis is on this ability to pay these long term contractual commitments, policy reserves established under a statutory valuation utilize conservative methodologies and assumptions. Accordingly, the liabilities are generally larger than if less conservative methodologies and assumptions had been used.

In the United States, the methodologies and assumptions are prescribed in a fairly precise manner by insurance laws and regulations and include significant provisions for adverse experience or deviations. For example, even though the life insurance company might be earning 7.5% on the assets supporting the policy reserves, insurance regulations require that it use a much lower interest rate such as 4% to establish the reserve. In addition, a significant portion of the costs incurred acquiring a policy are expensed when incurred since the assets used to pay for these costs are no longer available to provide for future benefits and service costs.

By expensing acquisition costs when incurred and using conservative assumptions in determining the reserves, a statutory valuation results in a conservative reporting of earnings in the early policy years. In particular, in the first policy year, statutory earnings of a block of life insurance policies or annuity contracts are usually negative because of the high acquisition costs. In the later policy years, however, statutory earnings are usually high as the conservatism in the reserves is released.

¹¹ *Proposed Statement of Financial Accounting Standards Fair Value Measurements*, [12] page 14-24.

Many of the insurance laws and regulations were written before the introduction of computers. Accordingly, many of the required techniques were based on practical considerations, such as not explicitly specifying all the actuarial assumptions in the determination of the policy reserve. For example, when determining reserves for whole life policies under the net level premium method, a mortality table and interest rate are explicitly specified. However, there are no explicit assumptions for expenses and lapse rates. These assumptions are implicitly provided through conservatism in the mortality tables, the interest rate and the reserve method.

In the United States, reliance is increasingly being placed upon the valuation actuary. Starting in the 1980s and continuing to today, there is a trend away from viewing policy reserves as “cookbook” items, and toward the view that the actuary must seriously consider whether these liabilities make good and sufficient provision for all unmatured obligations of the life insurance company for the guarantees under the terms of its policies. This has naturally led the actuary to consider the type of assets held in support of these liabilities and how the asset cash flows and the insurance cash flows relate under a wide range of scenarios.

In Canada, much more responsibility is placed on the appointed actuary. Unlike the United States law, Canadian law does not require specific mortality tables or interest rates to be used in determining reserve liabilities. Rather, these assumptions are chosen by the actuary. Furthermore, as we shall see later, Canadian statutory valuations tend to more realistically reflect future liabilities under the contracts, with less emphasis placed on conservatism. Canadian actuaries must explicitly recognize the impact of lapses and expenses, and use of the prescribed reserving method (the Canadian Asset Liability Method or CALM) can even sometimes produce negative reserves.

1.5.2 GAAP VALUATIONS

The methodologies under GAAP valuations are less prescriptive and the assumptions are generally based on company experience with more modest provisions for adverse experience. Furthermore, GAAP valuations incorporate explicit recognition of all actuarial assumptions that are considered material¹².

Another significant difference between statutory valuation principles and GAAP is the treatment of acquisition costs. To achieve a better matching of revenue with costs, GAAP requires that the costs incurred acquiring a policy are deferred and amortized in relation to the future revenue expected to be generated by the sale. This deferral process gives rise to an intangible asset called the deferred acquisition cost asset (DAC asset) which is often a significant portion of the GAAP equity of most life insurance companies.

1.5.3 TAX RESERVE VALUATIONS

Tax reserve valuations are used in order to calculate the policy reserve for purposes of determining taxable income. Policy reserves determined by a tax reserve valuation are often called **tax reserves**¹³. In the United States, tax reserves have historically been related to statutory reserves. From 1958 to 1984, tax reserves were based on the statutory reserves of the company, adjusted for some items. Because established companies frequently used more conservative reserving methods than new or growing companies, the prior law allowed restatement of tax reserves to a more conservative reserve method, using either exact or approximate methods. Also, an approximation formula was used to adjust the underlying reserve interest rate.

Congress perceived that this system was subject to abuse, compounded by the fact that the approximate recalculation methods specified in the law became less accurate as interest rates rose in the 1970's. Beginning in 1984 with the passage of DEFRA, the law was changed to require use of Federally Prescribed Tax Reserves

¹² Materiality addresses the question “Is this item large enough for users of the information to be influenced by it?” It is important that the actuary discuss materiality with those who make accounting decisions, generally within the accounting department. See Section VI in the Preamble of the NAIC *Accounting Practices and Procedures Manual* [18] for a more thorough discussion of materiality.

¹³ This term should be used with caution since tax specialists use this term for other purposes.

(FPTRs) in the calculation of taxable income. Federally Prescribed Tax Reserves are determined using the methodology and assumptions which the company uses to calculate statutory reserves, with adjustments, the most significant of which are:

- (1) The Commissioners Reserve Valuation Method (CRVM) must be used for life insurance policies and the Commissioners Annuity Reserve Valuation Method (CARVM) must be used for annuity contracts;¹⁴
- (2) The interest rate must be equal to the larger of (a) and (b), where:
 - (a) is the *Applicable Federal Interest Rate (AFIR)*; and
 - (b) is the prevailing state assumed interest rate, which is defined as the interest rate that at least 26 states permit in the determination of statutory reserves;
- (3) The mortality table must be the prevailing Commissioners standard mortality table that at least 26 states permit in the determination of statutory reserves;

In addition to these adjustments, federally prescribed standards specify additional adjustments in the determination of tax reserves.

In Canada, Policy reserves for income tax purposes underwent significant change in 1978, 1988 and then again in 1996. The 1988 changes were accompanied by transitional measures introduced to lessen the immediate impact on life insurers. For 1996, the new taxes rules retained the same tax reserves (“old rules”) for policies issued prior to January 1, 1996. For policies issued after December 31, 1995 a new set of tax reserves (“new rules”) were developed.

For ordinary life insurance policies issued prior to January 1, 1996, the maximum reserve permitted is calculated on the one and one-half year preliminary term basis,¹⁵ with a cash surrender value floor. Generally, this produces a lower reserve than both the net level premium method¹⁶ (which applied prior to 1978) and the one-year preliminary term method¹⁷ (which applied from 1978 to 1987) because effectively the reserve does not commence until about the mid-point of the second year. This methodology is in rough recognition of the fact that the cost of acquiring the policy may be written off immediately. Interest and mortality assumptions are those used in setting the premiums, except for participating life insurance policies with guaranteed cash surrender values (other than annuities) where the assumptions are those used in computing the cash surrender value. For group term policies with coverage not exceeding 12 months, there is an unearned premium reserve determined by apportioning the net premium over the policy period.

For policies issued after December 31, 1995, the maximum reserve permitted is the lesser of the insurer’s “reported reserves” and its “policy liabilities.” The reported reserve is the amount included in the insurer’s financial statements and the policy liability is the positive or negative amount of the insurer’s liability in respect of the policy as determined in accordance with accepted actuarial practice. Both reserves are calculated without reference to income or capital taxes. Tax reserves for group term policies remain the same as for pre-1996 policies.

1.5.4 GROSS PREMIUM VALUATIONS

Gross premium valuations are generally performed when it is desirable to produce a “best estimate” value of the liabilities of the company. Gross premium valuations may be appropriate when it is necessary to deter-

¹⁴ These reserve methods are defined in Chapter 5.

¹⁵ Ibid

¹⁶ Ibid

¹⁷ Ibid

mine the value of a company, such as in the case of an acquisition or merger, or when a company is being examined in order to determine solvency.

As with GAAP, gross premium valuations explicitly recognize all actuarial assumptions that are considered material. However, gross premium valuations are generally performed with assumptions that have little or no provision for conservatism (i.e., “best estimate” assumptions). In most cases, the reserves are calculated as the present value of future benefits and expenses less the present value of future gross premiums.

1.5.5 EMBEDDED VALUE

A relatively new and increasingly popular performance measurement system is *embedded value*¹⁸. Financial performance of the life insurance company is measured by the change in embedded value of the life insurance company over a specified time period. Under this measurement system, embedded value is the sum of the following two items:

- (1) Value of in force business; and
- (2) Adjusted net worth.

The value of in force business is the present value of projected after-tax statutory earnings minus the change in *required capital*¹⁹ of the blocks of in force policies that the company has sold. The earnings are discounted using the cost of capital. The *cost of capital* is the rate of return offered by investments with similar or equivalent characteristics. The cost of capital is often determined using the *Capital Asset Pricing Model (CAPM)*²⁰. Under CAPM, the cost of capital rate of return is the sum of the risk-free rate of return and a risk premium.

Adjusted net worth is the market value of assets supporting statutory surplus plus the present value of the cost of capital for holding required capital. Required capital is the minimum amount of capital and surplus the life insurance company must maintain to remain a going concern and to be in compliance with the covenants of debt obligations.

1.6 EFFECTS OF STATUTORY VALUATION REQUIREMENTS

The level of statutory reserves has many effects on a life insurance company other than the obvious direct financial implications.

1.6.1 GROSS PREMIUM LEVELS

Although statutory reserve requirements do not directly affect the gross premiums charged by the company, they do have an indirect impact. Generally, guaranteed premium rates for whole life and term policies and guaranteed fund accumulation rates for universal life policies are set at a level so as to avoid holding additional reserves. Also, when setting gross premium rates, companies must take into account the cost of establishing statutory reserves.

¹⁸ Embedded value is not a liability valuation method, but a performance measure.

¹⁹ See Chapter 16 for further discussion of required capital.

²⁰ See Brealey, Myers, and Allen [9] for a more complete discussion.

1.6.2 PRODUCT DESIGN

Aside from the design features inherent in the choice of guarantees as discussed above, statutory requirements often make otherwise desirable product features difficult or costly to reserve. Because of statutory reserve considerations, guaranteed cost of insurance rates for Universal Life policies are almost never less than mortality rates used to determine the policy reserve under a statutory valuation. Term policies often feature guaranteed premium rates higher than those actually charged, primarily to avoid deficiency reserves²¹. As a final example, interest guarantee structures of annuities can be influenced by Commissioners Annuity Reserve Valuation Method reserve levels.

1.6.3 FEDERAL INCOME TAXES

In the United States, federal income taxes are fairly insensitive to the actual statutory reserve level, as Federally Prescribed Tax Reserves are defined separately in the tax code. However, the choice of a statutory reserve basis still has several minor effects on tax reserves. Items unspecified in the tax code, such as whether tax reserves are calculated on a continuous or curtail basis, should follow the statutory practice for the plan in question. Also, in the United States, tax reserves for a policy may not exceed statutory reserves. Thus, the choice of a statutory basis which results in lower reserves than would be required on the Federally Prescribed basis would result in lower tax reserves than if a more conservative basis were used.

1.6.4 DIVIDENDS TO POLICYHOLDERS

There are many techniques used by companies to calculate policyholder dividends, but many companies use two- or three-factor formula methods using the statutory reserve as an input item in the calculation of the interest and mortality components. Where this is the case, the choice of the statutory reserve basis will have a significant effect on how dividends are distributed among the various classes of policyholders. Even if a company uses another method to calculate dividends, choice of a statutory reserve basis will enter into the calculation and allocation of surplus, thereby indirectly affecting distribution of dividends.

1.6.5 STATUTORY EARNINGS

The fact that statutory reserves affect statutory earnings is obvious in itself, but it leads to several interesting corollaries. In the United States, the amount of money which may be paid out as dividends to stockholders is generally limited by the accumulated statutory earnings of the company. This makes the realistic projection of statutory earnings the basis of determining the appraisal value of a life company, since the economic value of the company is most directly related to the present value of distributable earnings. It also means that the incidence of statutory earnings, and hence the appraisal value of the company, will be affected by the statutory reserve basis.

1.6.6 IMPORTANT INDICATORS

Several important indicators used by regulators, rating agencies, investment analysts and various marketing organizations to measure the strength of companies are based in part upon statutory financial measures. Many companies manage their business, including the selection of the statutory reserve basis, so that these indicators are as favorable as possible.

It is important to remember that the reserving method and basis do not directly affect the total profitability of a policy over its lifetime, only the emergence of profit by year. It can be shown that if two alternative sets of reserves for a policy grade together at the maturity date, the pre-tax profits produced by the two will have the same present value at issue, assuming the interest rate used to discount is the same rate at which investment

²¹ Deficiency reserves will be discussed in Chapter 7.

income is calculated. However, if a higher interest rate is used to discount, the set of reserves which are generally lower will produce the largest present value of profits.

1.7 STATUTORY VALUATION REQUIREMENTS IN CANADA²²

1.7.1 INSURANCE COMPANIES ACT

A significant rewrite of the federal Insurance Companies Act (ICA) was implemented in 1992 redefining the regulation of insurance companies and more specifically creating the role of Appointed Actuary. Several revisions to the ICA have been implemented since, but have not affected the defined responsibilities of the actuary. The appointed actuary has been given broad roles and responsibilities similar in concept to those of the appointed actuary in the United Kingdom:

- (1) Appointments will be made and terminated by the board of directors, and the actuary will have access to the board.
- (2) The actuary will value and report on actuarial and other policy benefit liabilities.
- (3) The actuary will report annually to the board of directors on the current financial position of the company. For foreign branches, the actuary reports to the Chief Agent.
- (4) The actuary may be directed by regulation to report on the future financial condition of the company.
- (5) The actuary is to have access to all necessary company records and information required in the performance of assigned duties.
- (6) If the actuary becomes aware of any circumstances that may have a material impact on the ability of the company to meet its obligations and which require rectification, he or she must bring the matter to the attention of management and the board.
- (7) If satisfactory action is not taken to correct the situation within a reasonable period of time, the actuary will have a statutory obligation to send a copy of his or her report to the Superintendent of Financial Institutions and so advise the board of directors.
- (8) The actuary is to render an opinion to the board on the administration of the company dividend policy prior to any distributions.

1.7.2 STANDARDS OF PRACTICE FOR THE APPOINTED ACTUARY

The Canadian Institute of Actuaries (CIA) is the national organization of the actuarial profession in Canada. Member driven, the Institute is dedicated to serving the public through the provision, by the profession, of actuarial services and advice of the highest quality. Its Guiding Principles are:

To ensure that services are provided by qualified individuals, the Institute maintains publicly visible programs and procedures for the attainment and maintenance of professional qualification by its members.

The Institute develops standards of professional practice and codes of conduct and, through its disciplinary process, ensures their compliance by its members.

The Institute promotes the development of a body of expert actuarial knowledge and practice relevant to Canadian social and economic needs. It encourages actuarial research and scholarly

²² This section was written by Richard May, FSA, FCIA.

activity and the dissemination of the results among its members. It encourages the application of actuarial science and technique to new areas where these are relevant.

The Institute cooperates with governments and public bodies and makes timely and relevant contributions to public policy issues.

To assure a continuing supply of qualified professionals, the Institute encourages the recruitment and training of new actuaries.

The Institute serves the professional needs of all Canadian actuaries regardless of area of practice, language, or geographic region.

To assist its members in their professional activities, the Institute develops technical support including collection and analysis of statistical data, and the publication of actuarial handbooks and texts.

The Institute represents Canadian actuaries internationally and cooperates with other national actuarial bodies in areas of mutual interest.

The Institute provides opportunities for the professional development of its members.

In conjunction with the new defined role of appointed actuary, the CIA developed and implemented new standards of practice for the appointed actuary of an insurance company which govern the conduct of the actuary in such matters as appointment, access to information, management reporting, board reporting and financial statements. The evolution of new products and new techniques has led to the development of further guidance and additional clarification.

In May, 2002, the Canadian Institute of Actuaries issued the “Consolidated Standards of Practice – General Standards” applicable to all Fellows and Associates of the Canadian Institute of Actuaries. In December, 2002, the Consolidated Standards of Practice – Practice Specific Standards for Insurers were issued. The consolidation of the Standards of Practice (SOP) was primarily a re-write of existing recommendations in a format and presentation that was more cohesive and consistent. The standards were to ensure that actuarial information be properly determined and fully disclosed, and that such information and disclosure be judged by peers as good actuarial practice and merit the respect and acceptance by the public and regulators. They consist of recommendations and other guidance intended to amplify the recommendations or to illustrate their application. The recommendations deal with the verification of valuation data, the development of appropriate assumptions, the choice of valuation method, and the text and implications of the reports accompanying the published financial statements and government statement. They also touch on documentation of the valuation actuary’s work, the use of approximations, and judgment regarding materiality. Information on the Standards of Practice and other CIA materials is publicly available on the Institute’s website, www.actuaries.ca.

While the recommendations provide sound general guidance for the practicing valuation actuary, they are most easily and directly interpreted in the context of traditional ordinary life insurance. However, there is a wide range of types of policies included in a typical valuation today. They present a variety of technical problems that are difficult to resolve by a straightforward interpretation of professional standards. To assist the valuation actuary in applying the Standards of Practice, the CIA has issued a number of publications. The following is a list of the current Canadian Institute of Actuaries Standards of Practice, Research Papers, Educational and Guidance Notes applicable to the valuation of individual insurance products:

205122	Consolidated Standards of Practice – General Standards
205060	Consolidated Standards of Practice – Practice Specific Standards for Insurers
205111	Educational Note: Valuation of Segregated Fund Investment Guarantees

205007	Educational Note: Margins for Adverse Deviations
205004	Educational Note: Best Estimate Assumption for Expenses
204054	Educational Note: Approximations to Canadian Asset Liability Method (CALM)
203106	Educational Note: Selection of Interest Rate Models
203083	Educational Note: Aggregation and Allocation of Policy Liabilities
202065	Educational Note: Future Income and Alternative Taxes
202037	Educational Note: Expected Mortality: Fully Underwritten Canadian Individual Life Insurance Policies
9803	Educational Note: Disclosure of Actuarial Information By Life Insurance Companies
9721	Research Paper: C-1 Risk
9634	Educational Note: Nature and Use of Derivatives
9633	Educational Note: Asset and Mortgage-Backed Securities
9627	Educational Note: Management, Risks, Regulations and Accounting of Derivatives
9626	Educational Note: Liquidity Risk Management
9543	Educational Note: Measurement of Exposure to Interest Rate Risk
9430	Guidance Notes: An Overview of an Investment Policy Statement in an Asset/Liability Management Context

In addition to the above, the CIA Committee on Life Insurance Financial Reporting (CLIFR) annually prepares a letter to actuaries on “Guidance for the Current Year’s Valuation of Policy Liabilities of Life Insurers” and the federal Office of the Superintendent of Financial Institutions (OSFI) distributes an annual “Memorandum to the Appointed Actuary on the Report on the Valuation of Life Insurance Policy Liabilities.” These two documents provide current advice, guidance and requirements with respect to preparing and reporting on valuations for the current year end.

As a regulator, OSFI can impose its own requirements on the performance of the actuary’s work. In addition to the above standards of practice, OSFI has implemented requirements to periodically perform an “External Review of the Actuary’s Work.” The purpose of the External Review is to:

- Maintain and strengthen confidence in the work of the Appointed Actuary by the public, by insurance company management and directors, and by supervisory authorities,
- Narrow the range of practice by Appointed Actuaries
- Improve the quality of the Appointed Actuary’s work
- Provide significant professional education for the Appointed Actuary

The CIA has also developed standards of practice for the external review process. These measures are a key component of the continual development process for actuaries and supplement the Standards for the Continuing Professional Development of the Actuary.

1.7.3 THE CANADIAN ASSET LIABILITY METHOD

The current statutory reporting basis for reserves in Canada is the *Canadian Asset Liability Method (CALM)*. CALM is a prospective method of valuation which uses

- (1) the full gross premium for the policy,
- (2) the estimated expenses and obligations under the policy (without arbitrary limitations),
- (3) current expected experience assumptions plus a margin for adverse deviations, and
- (4) scenario testing (deterministic or stochastic) to assess interest rate risks and market risks (particularly for segregated fund or variable annuity guarantees)

The CALM valuation method will be discussed in more detail in Chapter 14.

1.7.4 MINIMUM CONTINUING CAPITAL AND SURPLUS REQUIREMENTS

The calculation of actuarial liabilities serves a dual purpose: to provide for future obligations on the balance sheet and to appropriately charge income in the income statement. Canadian statutory valuations had in the past been performed primarily to meet the concerns of regulators that companies remain solvent. This is why prescribed Canadian valuation methods and assumptions were conservative.

The movement in Canada to make actuarial liabilities appropriate for both statutory and GAAP purposes has necessitated a fresh look at how management and regulators can be assured that a company will remain solvent.

In Canada, the guarantee association *Assuris* protects Canadian life insurance policyholders against loss of benefits due to the insolvency of a member company. Every life insurance company authorized to sell insurance policies in Canada is required, by the federal, provincial and territorial regulators, to be a member of Assuris.

Assuris does not cancel policies or pay cash compensation; Assuris facilitates the transfer of the policy to a solvent company and ensures the continuity of covered benefits under the original terms of the policy. To hasten this process and reduce losses, Assuris seeks to identify risks in both individual companies and the industry and works closely with the regulators on timely intervention.

Assuris is a not-for-profit organization funded by assessments of its members. Key elements of its governance include:

- (1) A Board of Directors, each of whom must be independent of members,
- (2) An Industry Advisory Committee that provides advice to the Board on coverage, the assessment system, and emerging issues,
- (3) The right of each of the participating jurisdictions (federal, provincial and territorial) to object to any change in Assuris' By-laws or Memorandum of Operations.
- (4) Member voting on By-law changes and Memorandum changes affecting costs.

The assessment base for each member is its Capital Required according to the Minimum Continuing Capital and Surplus Requirements (MCCSR) that operate for companies in Canada in much the same way that Risk Based Capital (RBC) operates for companies in the U.S. This measure is set by the primary regulators and is an important, risk-related component of life insurance supervision in Canada.

While Assuris maintains a liquidity fund in excess of \$100 million, the costs of an actual insolvency will be assessed on the continuing members after the insolvency. Assessments for an insolvency may continue in-

definitely at the rate of 1.33% of Capital Required, and other short-term assessments are available. The total present value of Assuris' assessment capacity is in excess of \$3.5 billion.

1.7.5 DYNAMIC CAPITAL ADEQUACY TESTING

The Canadian Institute of Actuaries created a Committee on Solvency Standards to study the actuarial aspects of corporate solvency and to provide guidance to actuaries practicing in this area. Accordingly, a standard of practice was adopted which requires the actuary to examine not only the company's current financial position, but also its financial condition, including its ability to withstand future threats to solvency.

The actuary's annual investigation of the company's solvency considers the past, present and future financial positions of the company and the sensitivity of surplus to changes in various experience factors and management policies. In addition to the base scenario normally underlying the company's business plan, a variety of other scenarios are suggested for investigation (worse than expected mortality, morbidity, withdrawals, expenses, changing investment yields, and so on), as well as any additional or integrated scenarios which the actuary considers appropriate to the circumstances. Investigations should include both the business in force and anticipated new business. Finally, the actuary should provide a written report to the board of directors each year outlining the investigation performed and presenting the significant findings and conclusions.

1.7.6 JOINT POLICY STATEMENT

An insurance company's auditor relies on the actuary for many items in the balance sheet and year-to-year changes in these liabilities implicit in the income statement. The actuary may in turn rely upon the auditor's verification of data on which the policy valuation is based.

A Joint Policy Statement was issued by the Canadian Institute of Actuaries and the Canadian Institute of Chartered Accountants in 1991 to address how the actuary and auditor should interact in meeting their professional responsibilities and how their roles should be disclosed to readers of financial statements.

The Joint Policy Statement recognizes that either the actuary or the auditor could be using the specialized work of the other, and outlines the following four aspects of the work that should be considered when preparing a report relying on such work:

- (1) The specialist professional's qualifications, competence, integrity, and objectivity.
- (2) The specialist professional's appointment to do the work.
- (3) Whether the specialist professional has followed the standards of his or her profession in carrying out the work.
- (4) The appropriateness of the specialist professional's findings and opinions.

In addition to the report of the auditor and the report of the actuary, the new legislation requires a statement of management describing the respective roles of the auditor and the actuary. The Canadian Institute of Chartered Accountants revised its Assurance and Related Services Guideline AuG-15, Audit of Actuarial Liabilities of Life Insurance Enterprises in December 2005. It requires the auditor to confirm and independently assess the policy liabilities. This may mean that the Joint Policy Statement will need to be revised.

This project will result in revisions to Assurance and Related Services Guideline AuG-15, Audit of Actuarial Liabilities of Life Insurance Enterprises, to more closely reflect current best practice.

1.8 STATUTORY VALUATION REQUIREMENTS IN THE UNITED STATES

In 1994, the NAIC devoted a significant amount of resources to codification of statutory accounting principles (SAP). The purpose of codification was “to produce a comprehensive guide to SAP for use by insurance departments, insurers, and auditors.”²³ A consistent and comprehensive guide to statutory accounting principles did not exist prior to codification. Accordingly, life insurance companies were sometimes uncertain about what principles to apply and regulators were not always familiar with the statutory accounting principles used in other states.

This comprehensive guide was first published in 1998 and is called the “*Accounting Practices and Procedures Manual*” (NAIC Manual). This manual has three major parts:

- (1) Preamble;
- (2) Statements of Statutory Accounting Principles (SSAPs); and
- (3) Appendices.

This manual does not preempt state laws and regulations. Instead, the objective of the NAIC is that this manual will be the foundation of a state’s statutory accounting practices and will be subject to modification by a state’s insurance commissioner.

It is important that an actuary who is responsible for the calculation of statutory reserves for individual life insurance and annuity contracts has a sound understanding of the following sections of this manual:

- Statement of Statutory Accounting Principles No. 50, “*Classifications and Definitions of Insurance or Managed Care Contracts In Force*” (SSAP No. 50);
- Statement of Statutory Accounting Principles No. 51, “*Life Contracts*” (SSAP No. 51);
- Appendix A-820, “*Minimum Life And Annuity Reserve Standards*” (A-820); and
- Appendix A-822, “*Asset Adequacy Analysis Requirements*” (A-822);

In addition, the actuary should have a sound understanding of the actuarial guidelines found in Appendix C of the NAIC manual and the *Actuarial Standards of Practice* promulgated by the Actuarial Standards Board of the American Academy of Actuaries that pertain to the particular type of life insurance policies and annuity contracts for which statutory reserves are being established. Finally, the actuary should be familiar with the concepts underlying **Risk Based Capital**,²⁴ how it is determined and how it is used.

1.8.1 SSAP NO. 50

SSAP No. 50 provides a general framework for classifying insurance contracts into four broad categories:

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

²³ See [18], Paragraph 12 of Preamble

²⁴ See Chapter 16 for a thorough discussion of Risk Based Capital.

These classifications reflect that the premium payment pattern and the protection provided are “fundamentally different and, therefore, require different income recognition and reserving methods.”²⁵ Product classification is important because it determines the recognition of revenue and costs and the methodologies and assumptions used to determine policy reserves.

1.8.2 SSAP No. 51

SSAP No. 51 establishes statutory accounting principles for income recognition and policy reserves for all contracts classified as life contracts in accordance with SSAP No. 50. In particular, Paragraph 5 of SSAP No. 51 states that “premiums shall be recognized on a gross basis (amount charged the policyholder) when due from policyholder under the terms of the insurance contracts.” Additionally, Paragraph 14 of SSAP No. 51 states “Statutory policy reserves shall be established for all unmatured contractual obligations of the reporting entity arising out of the provisions of the insurance contract.” Finally, Paragraph 15 of SSAP No. 51 states “The reserving methodologies and assumptions used in computation of policy reserves shall meet the provisions of Appendices A-820 and A-822 and the actuarial guidelines found in Appendix C of this manual.” Furthermore, SSAP No. 51 requires that policy reserves shall be in compliance with those Actuarial Standards of Practice promulgated by the Actuarial Standards Board.

1.8.3 APPENDICES A-820 AND A-822

Appendices A-820 and A-822 contain excerpts of the NAIC model *Standard Valuation Law* (SVL) and the model *Actuarial Opinion and Memorandum Regulation*, respectively. The Standard Valuation Law and Actuarial Opinion and Memorandum Regulation are the two most important model regulations governing a statutory valuation.

The Standard Valuation Law states:

*“Every life insurance company doing business in this state shall annually submit the opinion of a qualified actuary as to whether the reserves and related actuarial items held in support of the policies and contracts are computed appropriately, are based on assumptions which satisfy contractual provisions, are consistent with prior reported amounts, and comply with applicable laws of this state. The commissioner by regulation shall define the specifics of this opinion and add any other items deemed to be necessary to its scope.”*²⁶

The qualified actuary mentioned above is appointed by the Board of Directors of the life insurance company and is called the **appointed actuary**.

The Actuarial Opinion and Memorandum Regulation requires that the appointed actuary issue a **statement of actuarial opinion**. Within this actuarial opinion, the appointed actuary must attest to being “familiar with valuation requirements applicable to life and health insurance companies” and that the reserves are “at least as great as the minimum aggregate amounts required by the state in which this statement is filed.”

The statement of actuarial opinion should list the items and amounts for which the actuary expresses an opinion. There may be separate opinions for separate blocks of business; for example one actuary may sign an opinion relating to group insurance, while another signs an opinion relating to individual life insurance, and a third actuary signs an opinion relating to individual health insurance. Note, however that the opinion is on the adequacy of reserves in aggregate, and that it is possible for deficiencies in individual components of the reserves to be offset by margins in other components.

²⁵ See [18], Paragraph 4 of SSAP No. 50

²⁶ See [4], Standard Valuation Law Paragraph A of Section 3.

The statement of actuarial opinion frequently indicates reliance on others. For example, it may indicate reliance on others within the life insurance company for the accuracy and completeness of the underlying policy records, and reliance on actuaries with other companies for items such as reinsurance assumed. The statement of actuarial opinion should indicate the relationship of the actuary with the company, and the scope of the actuary's work and any reliances.

In addition, Actuarial Standard of Practice No. 22, *Statements of Opinion Based on Asset Adequacy Analysis by Actuaries for Life or Health Insurers* (ASOP NO. 22),²⁷ contains requirements with the key provisions of Section 3 paraphrased below:

Section 3.1

When performing an asset adequacy analysis, the actuary should review and apply applicable law and applicable actuarial standards of practice, such as ASOP No. 7, *Analysis of Life, Health, or Property/Casualty Insurer Cash Flows*²⁸. The actuary should be aware of the Actuarial Guidelines published by the NAIC and make a reasonable effort to be aware of generally distributed interpretations of each regulatory authority.

Section 3.2

The actuary should determine that he or she meets the requirements of the Qualification Standards for Prescribed Statements of Actuarial Opinion, promulgated by the American Academy of Actuaries. The appointment should be in writing, from the board of directors or its designee, citing the applicable law. If the appointment as an entity's appointed actuary is required by applicable law, the actuary should accept or withdraw from such an appointment in conformance with the applicable law. Acceptance of or withdrawal from the position should be in writing.

Section 3.3

The form, content, and recommended language of the statement of opinion may be specified by applicable law. The actuary should include in the opinion a statement on the adequacy of reserves and other liabilities based on an asset adequacy analysis, the details of which are contained in the supporting memorandum.

Section 3.4

The actuary should use appropriate analysis methods when forming an opinion with respect to asset adequacy. In judging whether the results from the asset adequacy analysis are satisfactory, the actuary should use professional judgment.

To assist the appointed actuary, the American Academy of Actuaries, in conjunction with the Society of Actuaries, publishes the *Life & Health Valuation Law Manual*.²⁹ This annual publication is designed to help the appointed actuaries comply with the Standard Valuation Law and Actuarial Opinion and Memorandum Regulation.

²⁷ See [2].

²⁸ See [1].

²⁹ See [4].

1.9 EXERCISES

1.9.1 KEY TERMS

claim reserves	loss reserves
policy reserves	actuarial reserves
actuarial valuation	actuarial assumptions
statutory accounting principles	generally accepted accounting principles
solvency	NAIC
IAS	Federally Prescribed Tax Reserves
market value	book value
fair value accounting	tax reserves
Applicable federal interest rate	CAPM
appointed actuary	actuarial opinion

1.9.2 QUESTIONS

- a. With what is this book primarily concerned?
- b. What is the role of reserves?
- c. What are the primary actuarial assumptions?
- d. What is the emphasis of statutory accounting?
- e. What is the primary emphasis of generally accepted accounting principles?
- f. What is the hierarchy for determining the fair value of an asset?
- g. Briefly describe the major types of valuation.
- h. What are some of the effects of statutory valuation requirements?
- i. What was the purpose of codification?

