Statutory Valuation of Individual Life and Annuity Contracts

Fifth Edition

Donna R. Claire, FSA, MAAA

Louis J. Lombardi, FSA, MAAA

Sheldon D. Summers, FSA, MAAA

Volume I

ACTEX Learning

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Volume I

ACTEX Learning

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Dedication

This book is dedicated to past, current and future actuaries
for the services that they have provided, are currently providing,
and will continue to provide to society.

Foreword

The actuarial science behind statutory reserving for life insurance companies has been relatively stable for nearly a century. The basic approach has always been formulaic and deterministic in nature. I had the good fortune to be introduced to actuarial mathematics and life contingencies and this formulaic approach as an undergraduate at Georgia State University under Robert W. Batten. It inspired me to witness someone explain difficult actuarial concepts at a level that anyone could understand.

Thirty-plus years later I had the pleasure of working with another pillar of actuarial academia while we were both on the faculty for an actuarial educational seminar, Louis J. Lombardi. I was able to witness firsthand Louis' amazing teaching style and his never ending quest to ensure students understood the material. He is constantly seeking new examples and methods to better educate his audience about life and annuity statutory reserving. His previous edition of *Valuation of Life Insurance Liabilities* was a staple of life and annuity actuarial reserve literature. So, when I heard there about the upcoming, greatly expanded 5th edition, I knew immediately that the actuarial community would significantly benefit from this seminal text. The inclusion of co-authors Donna Claire and Sheldon Summers, with their extensive experience and knowledge of the life, annuity and reinsurance area, makes this text even more relevant. They bring to bear many years of practical application that enhances the richness of the material. The addition of a second volume covering Principle-Based Reserving is invaluable as the approach to life reserving makes dramatic changes from the old formulaic to a new stochastic approach. The supplementary Excel models with explicit examples of all the reserve calculations and detailed formulae are invaluable for the practicing and aspiring valuation actuary.

As I sit here now writing this introduction, I am looking over fondly at my version of the Fourth Edition of this text, and I see the torn corners and bent up edges reflecting the multitude of times I have referenced this book. I eagerly await being able to replace my old version so the new version can be a permanent fixture on my bookcase and guide me in my practice.

D. Joeff Williams, FSA, MAAA

Joeff Williams will be the president-elect of the American Academy of Actuaries (Academy) in late 2018. He has been a consulting actuary for Actuarial Management Resources, Inc. in Winston-Salem, N.C., for the past 29 years. Prior to that, he worked at Integon Life Insurance Company in the Product Development area. His consulting work focuses on both the life and health insurance area. He has served as chairperson of the Academy's Life and Health Qualification Seminar and vice-chairperson of the Academy Council on Professionalism.

Preface

When the *Valuation Manual* became operative on January 1, 2017, it marked the most fundamental change to the valuation standards since 1943, the initial year the *Standard Valuation Law* went into effect. It was a complex undertaking and undoubtedly will evolve as the industry and regulators learn how these principles respond to changing conditions.

The primary goal of this book is to provide an understanding of the "old" and the "new" methods. Specifically, it covers the basic principles of the statutory valuation of individual life insurance and annuity contracts in the United States, including experience studies, model governance, and risk-based capital. It was written both for practicing actuaries and those considering a career in financial reporting, product development or risk management.

Like the fourth edition, the fifth edition has undergone a significant rewrite. Because of its length, the fifth edition has been divided into two volumes:

1. Volume 1 focuses primarily on basic principles, the valuation process, model governance, and formula-based reserves; and
2. Volume 2 focuses primarily on principle-based reserves, experience studies, and risk-based capital.

Equally important are the Excel workbooks. When reading these chapters, it may be helpful to have the Excel Workbook open to follow along with the text.

I want to thank Donna Claire and Sheldon Summers for agreeing to become co-authors of this edition. Their involvement over the years with the development of numerous reserve standards was invaluable. Second, I want to thank Anne Simpson for the significant amount of support she gave during the editing process. Although she has long been retired, she has not lost her gift of taking the technical jargon of actuaries and making them easier for others to understand.

I also appreciate the editorial and design contributions made by the staff at ACTEX Learning, especially, Stephen Camilli, Garrett Doherty, Victoria Grossack, and Jeff Melaragno.

Louis J. Lombardi, FSA, MAAA
Marlborough, CT
May 28, 2018

About the Authors

Donna Claire has over 40 years of experience in the insurance profession and heads Claire Thinking, Inc., which specializes in risk management and regulatory issues. She has worked on a number of American Academy of Actuaries committees on regulatory matters in the life and annuity areas. Mrs. Claire received the Jarvis Farley Award for volunteer service to the Academy and a 2016 Outstanding Volunteer Award for work on Principle-Based Reserves.

She is a Fellow of the Society of Actuaries, a member of the American Academy of Actuaries and a Chartered Enterprise Risk Analyst. She holds a Bachelor of Science Degree from The College of Insurance (now St. John's University School of Risk Management).

Louis Lombardi is a retired principal and actuary from the actuarial practice of PricewaterhouseCoopers, and a former director of the actuarial program at the University of Connecticut. He has forty years of experience in the life insurance industry with extensive knowledge of actuarial education, financial reporting, hedging, product development, software development, and surplus management.

He is a Fellow of the Society of Actuaries, a member of the American Academy of Actuaries and has a Master's Degree in pure mathematics from Tufts University.

Sheldon Summers is a consulting actuary with Claire Thinking, Inc. Prior to that he was Chief Actuary at the California Department of Insurance until his retirement in 2009 after 31 years of service. He has served on various committees of the National Association of Insurance Commissioners and of the American Academy of Actuaries on life insurance and reinsurance matters. In 2010, Sheldon received the American Academy of Actuaries' Robert J. Myers Public Service Award in recognition of contributions to the public good.

He is a Fellow of the Society of Actuaries, a member of the American Academy of Actuaries and holds a Master of Business Administration degree from the University of Southern California.

Access to Excel Models

As part of your purchase of this book, you should have received a key code to access the Excel models mentioned throughout this book. If you have any issues accessing these models, please contact the publisher at support@actexmadriver.com.

Part 1 | Valuation Requirements

1.

Overview of Valuation Concepts

At the end of 2015, approximately 142.4 million individual life insurance policies were in force.[1] 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 hundreds of these insureds reach their 100th birthday. In many cases, the policies covering these insureds were issued over fifty years ago. This development illustrates three important characteristics 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 commitment 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.

This book deals with ***policy reserves*** for individual life insurance policies and annuity contracts, including miscellaneous benefits that are often included in such policies. When we speak of statutory reserve valuation, the term ***reserve valuation*** refers to the methods, assumptions and procedures that are used to determine these policy reserves; and the term ***statutory*** refers to insurance laws and regulations of the state(s) which govern the methods, assumptions and procedures that are used in calculating policy reserves.

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[1] *2016 Life Insurers Fact Book*, American Council of Life Insurers (2016), Table 7.1, Page 66

1.1 Introduction

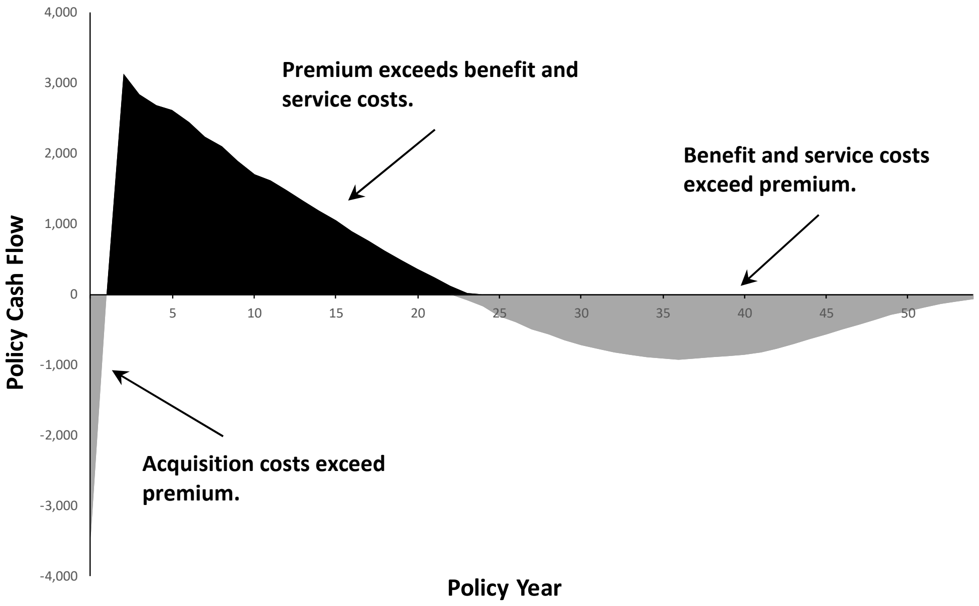
A significant amount of the liabilities of a typical life insurance company are policy reserves. These reserves are mostly devoted to the cost of future benefits and services. The magnitude of these reserves is such that a relatively small change in future expectations could significantly affect both the surplus and the earnings of the company during the period of the change. Consequently, the determination of policy reserves is one of 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 contract. The exact amount and the time of payment of these amounts are usually uncertain. Some reserves are held because the event insured against has already happened, but the amount of the claim has not been validated by the insurance company since the claim has not yet been reported or insufficient information has been furnished to the company. 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***.

1.2 Role of Reserves

Most individual 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 policy. This creates a timing problem that is often described as a mismatch between revenue and costs. For example, Figure 1.1 shows the typical pattern of the ***policy cash flows*** of a group of individual life insurance policies that pay a level premium and were sold at the same time.[2]

Figure 1.1: Policy cash flows of a block of whole life policies



This figure illustrates why life insurance companies establish policy reserves. Because mortality generally increases with age, the premiums collected by the insurance company in the early policy years usually exceed the expected cost of benefits and services provided during those years.[3] In contrast, the expected cost of benefits and services provided in the later years typically exceeds the premiums collected during those years.

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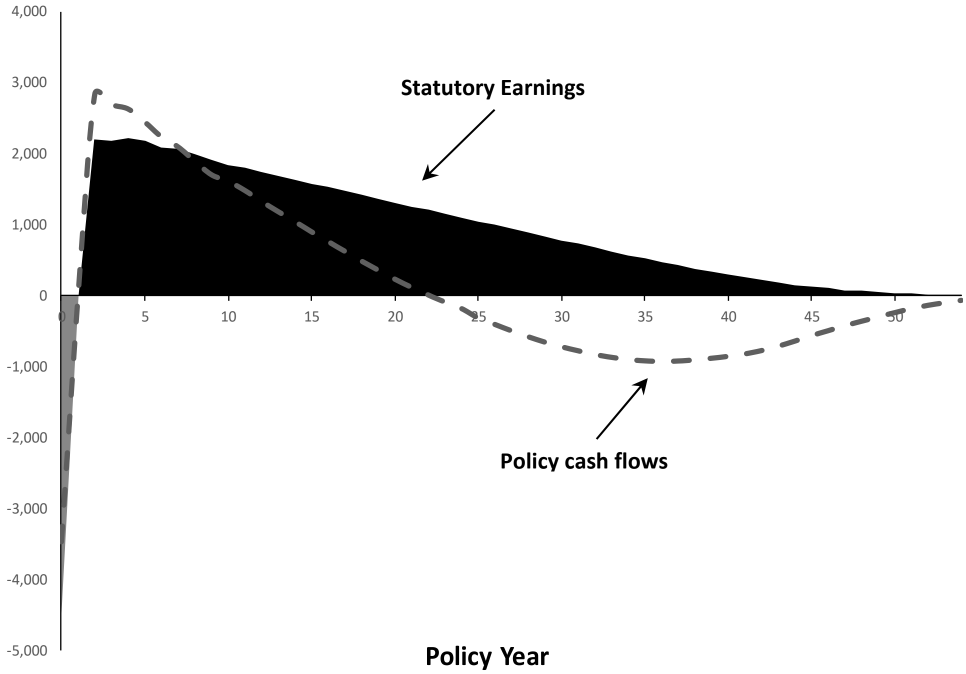
[2] Policy cash flows are the premiums and other amounts paid by the policy owner to the life insurance company and the benefits, expenses, and other amounts paid by the life insurance company to the policy owner or beneficiary as required by the policy or by law. A "block" of policies will usually mean a fairly large number of policies issued in a particular calendar year with fairly homogeneous risk characteristics (e.g., same age group, gender, underwriting criteria, etc.).

[3] In the first policy year, the costs for selling the policy ("acquisition costs") frequently exceed the premium.

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 premiums in the later policy years. Continuing with the above example, Figure 1.2 shows the annual earnings[4] of the block of whole life policies.

Figure 1.2: Relationship between policy cash flows and reserves



As 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, the cash shortfalls are 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 premiums collected plus the investment earnings on these assets.

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[4] The earnings for a particular period are the policy cash flows for that period minus the change in the reserve from the end of the previous period to the end of the current period.

Specifically, in the early policy years, when the premiums exceed the cost of benefits and services, assets are purchased that are expected to provide investment returns. In the later policy years, when the cost of benefits and services exceed the premium payments plus the investment earnings from the assets purchased, assets are sold to provide for these excess costs. Figure 1.3 illustrates the purchase and sale of assets.

Figure 1.3: Purchase and sale of assets

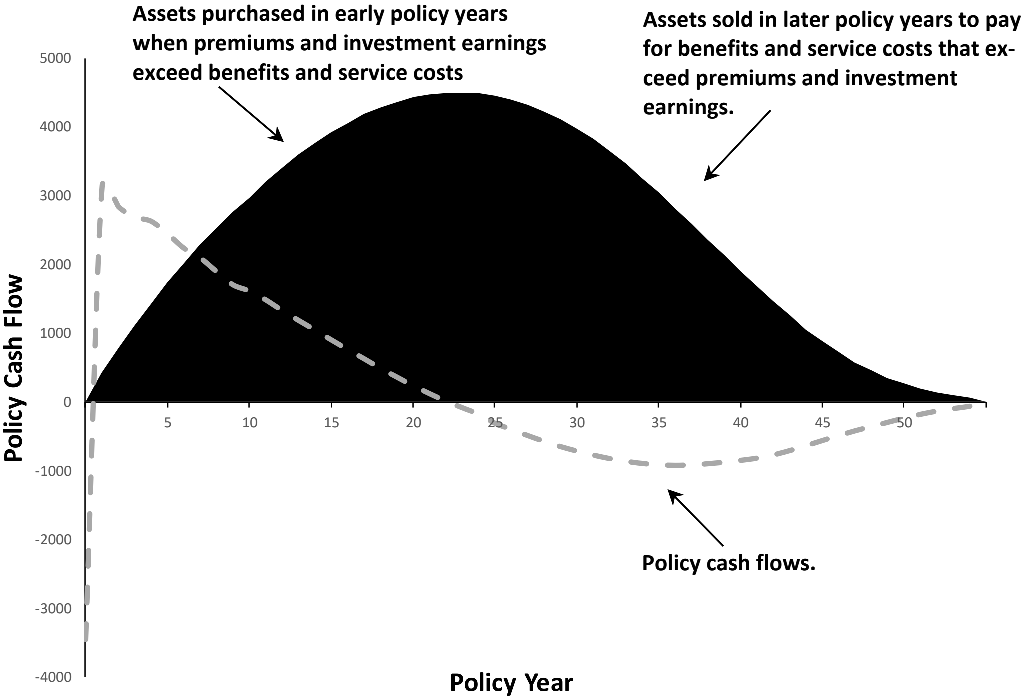

Figure 1.3 illustrates: (i) the increase in the assets in the early policy years when the expected premiums exceed the expected benefit and service costs; and (ii) the decrease in the assets in the later policy years when they are sold because the benefits and service costs exceed premiums and investment earnings.

1.3 Relationship between Assets and Liabilities

A very important relationship exists between the liabilities of a block of policies and the assets that are held in support of these liabilities. The expected behavior of the policy cash flows under various economic conditions will determine the types of assets that are purchased. This expected behavior of the policy cash flows reflects—among other factors—the type of insurance coverage, the reasons the policy owner has purchased this coverage, and the contractual obligations or guarantees of the life insurance company.

As was noted previously, the contractual obligations of life insurance companies can be for fifty years or longer. Often these obligations promise a minimum guaranteed interest rate or a minimum guaranteed periodic payment. For example, a whole life insurance policy issued to a 35-year-old will guarantee that the savings portion (i.e., cash value) will accrue at a guaranteed annual interest rate of 4% until the maturity date, which is often the date that the insured attains age 100 or 120. In addition, most life insurance policies and annuity contracts provide the policyholder with the unilateral right to terminate the policy and receive the cash value or other form of settlement at any time.

These kinds of contractual obligations determine the types of assets that life insurance companies purchase. In particular, Table 1.1 shows the distribution by asset category of the general account assets of U.S. life insurance companies at the end of 2015.

Table 1.1 2015 Distribution of Life Insurers General Account Assets

Asset Category	Amount ($ billions)	%
Bonds (long-term)	2,833.7	70.1
Stocks	90.4	2.2
Mortgages	414.9	10.3
Real estate	23.9	0.6
Policy loans	129.7	3.2
Short-term investments	60.0	1.5
Cash & cash equivalents	46.3	1.1
Derivatives	53.9	1.3
Other invested assets	178.1	4.4
Non-invested assets	209.0	5.2
Total Assets	4,040.0	100.0

Source: *2016 Life Insurers Fact Book*, American Council of Life Insurers, Table 2.1, Page 11

This exhibit shows that $3.25 trillion, or 80.4%, of the $4.04 trillion of the general account assets of life insurance companies was invested in bonds and mortgages. This reflects the fact that over 76.3% of the policy reserves held in the general account are for individual life and annuity contracts.[5] The majority of these life insurance policies and annuity contracts promise a minimum guaranteed interest rate, a minimum guaranteed periodic payment, and/or a minimum guaranteed cash value. Generally, bonds and mortgages provide the investment income needed to cover these types of guarantees and the liquidity to pay policyholders who exercise their unilateral right to terminate the policy for the cash value.

1.4 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 and surplus 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.

This effect on reported earnings and surplus has led to the notion of the ***risk of adverse deviation*** or ***provisions for adverse deviation (PADs)***. Each assumption used in the determination of reserves would be the expected value of that particular assumption plus a provision for the risk of adverse deviation. If experience unfolds as expected, these provisions will be released into earnings. Accordingly, this reserving methodology became known as "the release from risk policy reserve method."[6]

Results of a reserve valuation can vary, not only because of the legitimate 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 accuracy of these projections depends, among other factors, on 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 factors) 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 a reserve 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).

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[5] *2016 Life Insurers Fact Book*, American Council of Life Insurers (2016), Table 3.2, Page 27

[6] Horn, Richard G. "Life Insurance Earnings and the Release from Risk Policy Reserve System," Transactions of Society of Actuaries, Volume XXIII Part I (1971): 391-418.

Furthermore, since reserves are calculated using probabilities of future events (for example, the probability that a male age 35 will die between 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.

Finally, many life insurance and annuity products are exposed to market risk. This type of risk is often not possible to eliminate through diversification.[7] A risk is ***non-diversifiable*** if the risk is inherent to an entire market or market segment. This type of risk is also called ***systematic*** or ***market risk***. For example, buying a large number of corporate bonds among a wide variety of industries eliminates the risk unique to a particular company or industry. However, it does not eliminate the risk of loss due to rising interest rates or recessions. Non-diversifiable risk can only be managed by hedging (e.g., buying interest rate derivatives or credit derivatives), by product design, or by transferring this risk to another party (e.g., reinsurance).

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[7] Mortality is an example of a diversifiable risk. A variable annuity product with investment 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).

1.5 Accounting Principles

Financial statements provide information to a variety of users who often have very different concerns. 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 how the capital that they have invested in the life insurance company is being managed.

Both regulators and shareholders are important users of financial statements, but because their interests are significantly different, different accounting principles have been developed to serve their needs. These different accounting models can be divided into two broad categories: statutory accounting principles and generally accepted accounting principles.

1.5.1 Statutory Accounting Principles

Statutory accounting principles (SAP) focus on the relationship between the individual company and the state. In particular, SAP are the principles prescribed or permitted by the insurance laws and regulations of the state or country in which the insurance company is incorporated.[8] The primary reason for preparing financial statements in accordance with SAP is to help insurance regulators assess the ability of the life insurance company to satisfy its contractual obligations to policyholders. Accordingly, 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 surplus.[9] Furthermore, assets and liabilities are generally reported on conservative bases.

1.5.2 Generally Accepted Accounting Principles (GAAP)

Generally accepted accounting principles (GAAP) began its ascent in the second half of the nineteenth century "in response to the growth of the modern business enterprise and the separation of ownership and management."[10] Generally accepted accounting principles focus on the relationship between the "providers of capital" and the "stewards of capital."

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[8] ***Domestic life insurance companies*** are life insurance companies incorporated in a particular state.

[9] Statutory capital and surplus is the amount of assets in excess of liabilities.

[10] Edwards, J.R. *A History of Financial Accounting*. Routledge (1989), p. 15.

The "providers of capital" are shareholders, bondholders and other lenders, and the "stewards of capital" are the board of directors and management. Thus, generally accepted accounting principles are an important source of information to the capital markets. Accordingly, they perform a central role in the allocation of capital.

Financial statements prepared in accordance with GAAP 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 in order to determine if management is maximizing the value of the company. Accordingly, under GAAP, the emphasis switches to the matching of current revenue with current costs.[11] 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.

1.5.3 Fair Value Accounting

In 1993, the Financial Accounting Standards Board (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 FASB and the International Accounting Standards Board (IASB) 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 were 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 were to sell this 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.

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[11] With the adoption of several standards since the early 1990s, FASB began placing increasing emphasis on the balance sheet.

Fair value accounting reports 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."[12] 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 its value:

- Market value when available
- Market value of similar instruments, with appropriate adjustment
- Present value of projected cash flows

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

1.5.4 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 specifically 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 deferred acquisition cost (DAC) tax. Similar to GAAP, the concept was that certain expenses (for example, commissions, underwriting costs 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 these companies paid.

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[12] FASB exposure draft, Proposed Statement of Financial Accounting Standards Fair Value Measurements (June 23, 2004), pages 14-24.

1.6 Accounting Standards Bodies

There are five major authorities that are involved with the development of the accounting principles discussed in the previous section:

- National Association of Insurance Commissioners (NAIC)
- Securities and Exchange Commission (SEC)
- Internal Revenue Service (IRS)
- Financial Accounting Standards Board (FASB)
- International Accounting Standards Board (IASB)

The SEC and the IRS are government agencies, whereas, the NAIC, FASB and IASB are private-sector organizations.

1.6.1 NAIC

In the United States, SAP 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 NAIC assists state insurance officials with the development and maintenance of SAP. One of the objectives of the NAIC is to provide a standard against which exceptions will be measured and disclosed.[13]

1.6.2 SEC

The *SEC* was created by the Securities Exchange Act of 1934. The SEC has the legal authority to set accounting standards and reporting requirements for publicly traded companies—companies with financial securities issued on a United States exchange (e.g., the New York Stock Exchange). The SEC has broad powers over the type of information that must be reported, the amount of information that must be reported, and the frequency and timing of when this information is reported.

The SEC's primary focus is to protect investors. It has left the task of developing accounting rules and regulations to the various other accounting bodies. However, the SEC does occasionally exert its authority in these areas as well.

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[13] NAIC constitution.

1.6.3 IRS

The primary purpose of the IRS is to collect taxes for the United States government. It is a bureau of the Department of the Treasury and is under the direction of the Commissioner of Internal Revenue. It is important to note that the IRS does not write tax laws. This is the responsibility of the United States Congress (i.e., the legislative branch).

In addition to collecting taxes, the IRS issues various pronouncements and rulings. The primary purpose of these pronouncements and rulings is to state the IRS's position on a particular tax issue. However, since the IRS cannot write tax laws, taxpayers have the right to challenge the validity of the pronouncement or ruling in a court of law. If the courts determine that the IRS has exceeded its authority, the particular pronouncement or ruling will be ruled invalid.

1.6.4 FASB

When a company issues securities on a United States exchange (e.g., the New York Stock Exchange) it must prepare a registration statement for approval by the SEC. This statement must include financial reports prepared in accordance with U.S. GAAP.

FASB is the primary accounting standards body responsible for establishing the accounting standards that govern the preparation of financial reports prepared in accordance with U.S. GAAP by nongovernmental entities. The mission of FASB is "to establish and improve standards of financial accounting and reporting that foster financial reporting by nongovernmental entities that provide decision-useful information to investors and other users of financial reports."[14]

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[14] FASB mission statement.

1.6.5 IASB

With the growth of financial markets around the world, there has been an increasing need to enhance global financial reporting standards. 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 statements.[15]

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. In the past, they were required to 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. However, due to the efforts of the IASB, this has changed.

The IASB has been working with the SEC, the European Council of Ministers,[16] 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 Financial Reporting Standards (IFRS) as being in compliance with their local GAAP standards.

The IASB achieved a major step toward this goal in 2002. Rather than developing their own accounting principles, the European Council of Ministers required listed companies throughout the European Union to use IFRS starting in 2005. In 2007, IASB achieved another major milestone when the SEC waived the reconciliation requirement between U.S. GAAP and IFRS for foreign companies listed on a U.S. exchange. Furthermore, the SEC has granted selected U.S. multi-national companies the option to begin reporting under IFRS. Thus, foreign companies and selected U.S. multi-national companies are able to avoid preparing financial statements under multiple general purpose accounting standards.

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[15] IASB mission statement.

[16] The European Council of Ministers is the primary decision making authority of the European Union (EU).

1.7 Types of Reserve Valuations

The methodology and assumptions underlying the determination of policy reserves depend upon whether the financial statements are being prepared in accordance with SAP, GAAP, fair value accounting principles, or another accounting basis. Accordingly, there are several different types of valuations.

1.7.1 Statutory Reserve 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 the company's ability to pay these long-term contractual commitments, statutory valuations utilize conservative methodologies and assumptions. Accordingly, the liabilities are generally larger than if less conservative methodologies and assumptions had been used.

For example, even though a life insurance company might be earning 6.5% on the assets supporting its policy reserves, insurance regulations may require that they use a much lower interest rate such as 4% to establish the reserve. In addition, a significant portion of the costs incurred in 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.

Many of the current 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.

Until recently, the methodologies and assumptions were prescribed in a fairly precise manner by insurance laws and regulations. For example, if two different actuaries were asked to calculate the curtate Commissioners Reserve Valuation Method (CRVM) reserves for a whole life policy issued to a 35-year-old male using the 1958 Commissioners Standard Ordinary (CSO) Mortality Table on age nearest birthday and a 4% interest rate, they would calculate the exact same reserves. In fact, the Society of Actuaries used to publish a manual that showed the terminal reserve, mean reserve and other monetary values for the American Experience Mortality Table, the 1941 CSO Mortality Table, and the 1958 CSO Mortality Table for a range of valuation interest rates. The prescriptive nature of this type of statutory reserve valuation is often referred to as ***formula-based reserving***.

Starting in the 1980's 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 adequate provision for all unmatured obligations of the life insurance company under the terms of its policies under a wide range of economic scenarios. This has naturally led the actuary to explicitly consider all the actuarial assumptions, the type of assets held in support of these liabilities, and how the asset cash flows and the liability cash flows relate under a wide range of scenarios. This led to a statutory requirement (in the early 1990's) that formula-based reserves on a companywide basis be tested for adequacy by either cash flow testing or some other type of asset adequacy analysis appropriate for the type of business being analyzed. More recently, statutory reserve requirements have been modified to place more emphasis on modeling for determining policy reserves. This type of statutory reserve valuation is often referred to as ***principle-based reserving***.

1.7.2 GAAP Reserve Valuations

Since the publication of "Audits of Stock Life Insurance Companies,"[17] a ***GAAP reserve valuation*** has been less prescriptive. Furthermore, the assumptions are generally based on company experience with more modest provisions for adverse experience, or in many cases, no provisions for adverse experience. Finally, GAAP valuations incorporate explicit recognition of all actuarial assumptions that are considered material.

Another significant difference between a statutory reserve valuation and a GAAP reserve valuation 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.

With the adoption of principle-based reserving by state regulators and the movement toward fair value by FASB, the difference between a statutory reserve valuation and a GAAP reserve valuation is narrowing. However, it is important to remember that the primary emphasis of these two accounting models has not changed.

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[17] "Audits of Stock Life Insurance Companies," American Institute of Certified Public Accountants (1972)

1.7.3 Tax Reserve Valuations

Tax reserve valuations are used in order to calculate the policy reserves for purposes of determining taxable income. Policy reserves determined by a tax reserve valuation are often called tax reserves. 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.[18] 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 (FPTRs) in the calculation of taxable income. FPTRs are determined using the methodology and assumptions that the company uses to calculate statutory reserves, adjusted as follows:

(1) CRVM must be used for life insurance policies and CARVM must be used for annuity contracts

(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.

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[18] As was noted earlier, acquisition costs used exceeded the premiums collected in the first policy year. Accordingly, a new or rapidly growing company incurred significant surplus strain and tried to minimize this strain by holding the smallest statutory reserve required by the standard valuation law.

1.7.4 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 determine 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.

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).[19] In most cases, the reserve is calculated as the present value of future benefits and expenses less the present value of future gross premiums.

1.7.5 Fair Value Valuations

Fair value valuations are generally performed when the insurance contract has an ***embedded derivative***. For example, a variable annuity contract allows the contract owner to invest the savings component (i.e., fund balance) into different types of separate accounts (e.g., stocks, bonds, mutual funds).[20] Because the contract owner bears the risk that these investment can decrease in value, insurance companies often provide a guaranteed minimum benefit, such as the cash surrender value at age 65 is the larger of the account balance at that time or the accumulated value at fixed interest rate of 5% of all net deposits (gross deposits less partial withdrawals) from the time of deposit to age 65. This type of guaranteed minimum benefit is called a guaranteed minimum accumulation benefit (GMAB) and is an example of an embedded derivative. Under U.S. GAAP, a fair value valuation must be performed to determine the value of this embedded derivative.

A fair value valuation of an embedded derivative typically requires performing projections of cash flows associated with the embedded derivative under stochastically generated scenarios. These cash flows would then be discounted back to the valuation date using risk-free interest rates plus a non-performance spread. Non-performance spread would reflect the credit worthiness of the insurance company.

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[19] In some cases, provisions for adverse deviation (PADs) are included.

[20] A separate account is like a mutual fund that pools deposits from investors and purchases assets within stated investment objectives of the fund (e.g., large cap growth stocks).

1.7.6 Market Consistent Embedded Value

A relatively new and increasingly popular performance measurement system is ***Market Consistent Embedded Value (MCEV)***. Originally, financial performance of the life insurance company was 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 (1) value of inforce business; and (2) adjusted net worth.

The value of inforce business is the present value of projected after-tax statutory earnings minus the change in required surplus 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 characteristics. The cost of capital is often determined using the Capital Asset Pricing Model (CAPM). 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.

In June, 2008 the CFO Forum published “MCEV Principles” and the associated document Market Consistent Embedded Value Principles and Basis for Conclusions. The MCEV Principles paper promulgated MCEV as the generally accepted standard form of embedded value in a market consistent, risk neutral framework. Many feel that MCEV marks the natural evolution of embedded value to a basis that provides great comparability across companies and greater consistency with concepts applied by other financial institutions and the capital markets.[21]

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[21] *Market Consistent Embedded Values,* Practice Note. American Academy of Actuaries (March 2011).

1.8 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.

1.8.1 Gross Premium Levels

Although statutory reserve requirements do not directly affect the gross premiums charged by the company; they have indirect effects. 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 certain additional reserves, known as "deficiency reserves." Also, when setting gross premium rates, companies must take into account the cost of capital required due to statutory reserve requirements.

1.8.2 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 the 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 reserves. As a final example, CARVM can influence interest guarantee structures of annuities.

1.8.3 Federal Income Taxes

In the United States, federal income taxes are fairly insensitive to the actual statutory reserve level (except when the statutory reserve is less than the tax basis reserve), as FPTR 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 curtate 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 that 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.

1.8.4 Dividends to Policyholders

There are many techniques used by companies to calculate policyholder dividends, but many companies use factor formula methods utilizing the statutory reserve as an input item in the calculation of the interest and mortality components. Where this is the case, the choice of 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.

1.8.5 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 that 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.

1.8.6 Statutory Surplus

Clearly, statutory reserves have a direct impact on the level of statutory surplus. It is very common for life insurance companies to manage their surplus above a target amount. When surplus begins to approach this target amount, the life insurance company will often take one or more actions to prevent it from falling below the target amount. For example, the life insurance company may limit the sales of certain “high surplus strain” products (i.e., products that result in a significant amount of statutory losses in the first year). Instead of limiting sales, these companies may enter into reinsurance agreements to limit surplus strain.

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

1.9 Insurance Company Regulation

Insurance regulation is principally carried out by state insurance commissioners and their staffs pursuant to state law. Insurance companies are subject to regulation by all states in which they do business, not just the state in which they are organized or headquartered. Insurance regulation is broad and pervasive, covering substantially all aspects of an insurer's business, including product authorization, contract terms and guarantees, marketing and sales practices, agent licensing, company organization and governance, accounting and actuarial practices, capital standards and solvency, permissible assets, rehabilitation and liquidation of financially impaired insurers, and purchases and sales of insurance companies.

Unlike banks and brokerage companies, that are primarily regulated by federal agencies, insurance companies are primarily regulated by state insurance departments. The various state insurance regulators have recognized that there are many aspects of their regulatory functions that would benefit from uniform standards and procedures among the various states. Not only can individual regulators learn from the experiences of their counterparts in different states, uniform standards are more efficient for insurance companies that operate in many states. To facilitate cooperation among the state insurance regulators, the regulators have created and are members of the National Association of Insurance Commissioners (NAIC).

The mission of the NAIC is to assist state insurance regulators, individually and collectively, in serving the public interest and achieving the following fundamental insurance regulatory goals in a responsive, efficient and cost effective manner, consistent with the wishes of its members:

- Protect the public interest
- Promote competitive markets
- Facilitate the fair and equitable treatment of insurance consumers
- Promote the reliability, solvency and financial solidity of insurance institutions
- Support and improve state regulation of insurance[22]

One of the activities the NAIC undertakes is to adopt and publish model acts, laws and regulations with the intent that the models be enacted by state legislatures or issued by insurance regulators to promote uniformity and the achievement of standards in the regulation of insurance companies. The NAIC follows a formal procedure when it adopts new model laws or revises existing models.[23] In order to begin developing a model law or revision, the NAIC must determine that the "issue that is the subject of the Model Law necessitates a minimum national standard and/or requires uniformity amongst all states" and that "NAIC members are committed to devoting significant regulator and association resources to educate, communicate and support a model that has been adopted by the membership."

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[22] National Association of Insurance Commissioners. 2015. "About the National Association of Insurance Commissioners (NAIC)." Last modified December 31. http://www.naic.org/index_about.htm.

[23] *See* NAIC, "Procedures for Model Law Development," adopted May 2007, amended September 2008 and updated July 2013. http://www.naic.org/documents/committees_models_procedures.pdf.

The NAIC follows a collaborative and consultative process when developing a model law. The NAIC committee, task force, working group or subgroup charged with developing a model law solicits input from interested parties, including professional organizations such as the Society of Actuaries, the American Academy of Actuaries, and the American Institute of Certified Public Accountants. It then prepares and exposes drafts of the proposed model and considers comments received from the public. A model law or revision is expected to be developed by the assigned NAIC group within one year of receiving approval to begin development, although an extension of time may be made. After the model development is completed, the proposed model must be approved by a two-thirds vote of the responsible sponsoring committee followed by a minimum two-thirds majority vote of the NAIC Executive Committee or full membership in a plenary session. Upon NAIC adoption of the Model Law, it will be a priority of the NAIC, through the collective efforts of the members, to uniformly adopt the Model Law in a majority of states within three years after its adoption by the NAIC membership.

Another activity the NAIC undertakes is the accreditation of the state insurance departments. As the organization itself describes:

> The NAIC Accreditation Program was established to develop and maintain standards to promote effective insurance company financial solvency regulation. The purpose of the accreditation program is for state insurance departments to meet baseline standards of solvency regulation, particularly with respect to regulation of multi-state insurers …. The accreditation program relies on state certification by other regulators (i.e., peer review), requires risk-focused financial surveillance including on-site examinations, and requires solvency-related model laws, rules and guidelines that have been produced through consensus and collaboration.[24]

The required solvency-related model laws required to be adopted by a state for its insurance department to be accredited include, among others: the Actuarial Opinion and Memorandum Regulation, the Risk-Based Capital Model Act, and the Model Standard Valuation Law ("Standard Valuation Law"), each of which are described elsewhere in this book. The accreditation standards also require the insurance department to require insurance companies to follow those accounting procedures and practices prescribed by the NAIC's Accounting Practices and Procedures Manual.

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[24] The Center for Insurance Policy and Research of the NAIC (2016). "Accreditation." Last modified January 7, 2016. http://www.naic.org/cipr_topics/topic_accreditation.htm.

1.10 NAIC Accounting Practices and Procedures Manual

In 1994, the NAIC devoted a significant amount of resources to codification of statutory accounting principles. The purpose of codification was "to produce a comprehensive guide to SAP for use by insurance departments, insurers, and auditors." A consistent and comprehensive guide to SAP 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)***.[25] This manual has three major parts:

(1) Preamble
(2) Statements of Statutory Accounting Principles (SSAPs)
(3) Appendices

The NAIC 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 have 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

Because of their importance, these statements will be discussed in more detail in a later chapter.

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[25] "Accounting Practices and Procedures Manual," National Association of Insurance Commissioners (2015).

1.10.1 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

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

1.10.2 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.

1.11 Statutory Minimum Reserve Requirements

The ***valuation standard*** indicates the methodology and assumptions used to determine the policy reserves under a statutory valuation. In the United States, the valuation standard is determined by the state valuation laws in effect as of the issue date of the policy. While specific valuation requirements can vary from state to state, all states have adopted some form of the model ***Standard Valuation Law (SVL)*** developed by the National Association of Insurance Commissioners.[26]

The ***Standard Valuation Law (SVL)*** and ***Actuarial Opinion and Memorandum Regulation*** are the two most important model regulations governing a statutory reserve valuation. Under a principle-based system, the ***Valuation Manual***, which sets forth the minimum reserve and related requirements pursuant to the SVL, is also an important publication.

Since the methodologies and assumptions used to determine policy reserves are significantly different for the major types of individual life insurance and annuity contracts, separate chapters will discuss the valuation standards for:

- Whole life contracts[27] (including limited payment and endowment contracts)
- Term life contracts
- Universal life type contracts
- Variable life contracts
- Annuities

The remainder of this text focuses primarily on the minimum reserve standards for individual life and annuity contracts as discussed in the SVL and Valuation Manual with occasional comments as to differences in treatment of U.S. tax reserves and U.S. GAAP reserves.

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[26] Both Appendix A-820 of *Accounting Practices and Procedures Manual* and the *Life and Health Valuation Law Manual* contain a copy of the *Standard Valuation Law*.

[27] In this book, whole life contracts, limited payment contracts and endowment contracts will often be collectively referred to as whole life contracts when a distinction among the differences between these contracts is not necessary.

1.12 Risk-Based Capital Requirements

To function as an ongoing concern and to allow for the various risks associated with the business of insurance, life insurance companies need surplus in addition to their required statutory reserves. On December 6, 1992, the NAIC adopted the ***Risk-Based Capital (RBC) for Life and Health Insurers Model Act***. This landmark act significantly increased the minimum capital requirements for most life insurance companies and increased state regulators' authority over life insurance companies whose financial conditions deteriorate.

Prior to this act, regulators generally required each life insurance company to maintain as little as $5 million capital, regardless of the company's size and the types of risks it had undertaken. The RBC formula in this model act determines a "minimum" capital and surplus level. This minimum identifies life insurance companies with inadequate capital levels for regulatory attention.

The RBC formula reflects the riskiness of invested assets and the type of insurance products companies underwrite. The formula classifies a life insurance company's risks into five major categories:

> **Asset Risk – Affiliates (C-0)**: this category is intended to cover the risk of default of assets for affiliated investments
>
> **Asset Risk – Other(C-1)**: this category is intended to cover such risks as the losses of principal due to default of debit instruments and market losses in equity instruments
>
> **Insurance Risk (C-2)**: this category is intended to cover such risks as losses due to adverse mortality and morbidity
>
> **Interest Rate Risk, Health Risk and Market Risk (C-3)**: this category is intended to cover such risks as losses due to having to reinvest funds when market yields fall below levels guaranteed to policyholders; and the risk of having to sell assets when market yields are above the levels at which the assets were purchased (and hence the current price of the asset is below the purchase price). It is also intended to cover the risk of loss on variable products with guarantees (e.g., variable annuities and variable life with living benefits and guaranteed minimum death benefits) due to changes in market returns
>
> **General Business Risk (C-4)**: this category is intended to cover such risks as losses due to fraud, mismanagement and other business risks.

The formula reflects correlations among the various risk components.

The ***RBC ratio*** is a life insurance company's actual adjusted capital and surplus divided by the life insurance company's RBC. If this RBC ratio falls below a specified level, certain "action levels" are triggered, ranging from a "mandatory control level" where the insurance commissioner must seize control of the company, to a "trend test level" where the company must perform an additional test to determine trends in the RBC ratios.

1.13 Risk Management and Own Risk and Solvency Assessment Model Act

In response to the financial crisis of 2007-2008, the NAIC established the ***Solvency Modernization Initiative*** (SMI) in June of 2008. The SMI is a critical self-examination by regulators and the industry of the insurance solvency regulation framework. The scope included all aspects relative to the financial condition of an insurer. The key solvency areas that SMI was chartered to focus on include capital requirements, governance and risk management, group supervision, statutory accounting and financial reporting, and reinsurance.

As part of the SMI, the NAIC adopted the ***Risk Management and Own Risk and Solvency Assessment Model Act*** (ORSA). ORSA provides a statutory basis for requiring a risk management framework and the filing of an ORSA summary report. Under ORSA, effective January 1, 2015, insurers above a premium threshold are required to follow the ***NAIC ORSA Guidance Manual*** and submit an ***ORSA Summary Report*** to the lead state commissioner. Within the ORSA Summary Report, an insurer is expected to discuss four major areas covering its: (i) risk management framework, (ii) assessment of risk exposure, (iii) assessment of risk capital at group level, and (iv) prospective solvency assessment.

The NAIC also established the regulatory guidance for reviewing the ORSA Summary Reports submitted by insurers. Guidance has been published—one for the lead state Financial Condition Examiner and the other for the lead state Financial Analyst. The focuses of the state examination and assessment will include the insurer's risk management framework and its effectiveness, capital, liquidity, and overall financial strength of the insurance group.

Through these developments, the solvency regulation for the life insurance industry has moved further in the direction of focusing on the types of risks a life insurance company assumes and how it is managing this risk. Additional capital assessments are expected to be included in ORSA to complement RBC as a financial regulatory safeguard.