STATUTORY RETURNS ON SURPLUS AND THE COST OF EQUITY CAPITAL

Sholom Feldblum

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Biography

Sholom Feldblum is an Associate Actuary with the Liberty Mutual Insurance Company in Boston, Massachusetts. He was graduated from Harvard University in 1978 and spent the next two years as a visiting fellow at the Hebrew University in Jerusalem. He became a Fellow of the CAS in 1987, a CPCU in 1986, an Associate of the SOA in 1986, and a member of the American Academy of Actuaries in 1989. In 1988, while working at the Allstate Research and Planning Center in California, he served as President of the Casualty Actuaries of the Bay Area and as Vice President of Research of the Northern California Chapter of the Society of CPCU. In 1989, he served on the CAS Education and Testing Methods Task Force. He is presently a member of the CAS Syllabus Committee, the CAS Committee on Review of Papers, the Advisory Committee to the NAIC Casualty Actuarial (EX5) Task Force, and the Actuarial Advisory Committee to the NAIC Risk Based Capital Task Force, and he is the quarterly review editor for the *Actuarial Review*. Previous papers of his have appeared in *Best's Review*, the *CPCU Journal*, the *Proceedings of the Casualty Actuarial Society*, the *Actuarial Digest*, the *CAS Forum*, and the *CAS Discussion Paper Program*.

Abstract

The statutory return on surplus for the insurance industry has averaged slightly over 10% during the 1970's and 1980's. Estimates of the cost of equity capital during the same period have averaged about 16%.

The cost of capital and the firm's accounting return may differ for various reasons. For instance, company growth may depress the statutory return on surplus in several ways. First, acquisition and underwriting costs are expensed when incurred, but no recognition is given to the "equity" in the unearned premium reserve (the "deferred acquisition costs"). If the insurer is growing, this equity increases over time, statutory earnings may be understated, and the return on surplus may be depressed.

Second, loss and loss adjustment expenses are held at undiscounted values on the statutory balance sheet. If the insurer is growing, the "unrecognized interest discount" in the loss reserves increases over time, statutory earnings may be understated, and the return on surplus may be depressed.

These two effects account for about 2.16 points of return, or slightly over a third of the discrepancy between the statutory return on surplus and the cost of equity capital. These adjustments to statutory returns allow a more accurate assessment of insurer profitability.

STATUTORY RETURNS ON SURPLUS AND THE COST OF EQUITY CAPITAL

Insurers' returns on surplus have been used to measure profitability by state regulators, consumer activists, and company managers. Several aspects of insurance accounting have raised questions about the usefulness of this measure. In particular, the industry's statutory return on surplus has been consistently lower than financial estimates of the cost of equity capital, another measure of company profitability.

Part of the difference stems from the interaction of company growth with two facets of statutory accounting: the non-recognition of the "equity" in the unearned premium reserve and the undiscounted estimates of loss and loss adjustment expense reserves. This paper estimates the effects of these two accounting practices on the reported returns on surplus.

The discrepancy between accounting and financial estimates has implications for policy pricing. Some state regulators, as in California, have used historical accounting data to determine an allowable return on equity for insurers. These returns may be used in financial models to set premium rates for subsequent policy years. The use of unadjusted statutory returns may lead to inadequate premium rates.

Statutory Return on Surplus

The A. M. Best Corporation aggregates Annual Statement figures reported by each insurer into industry totals. The all lines combined operating margins have averaged 5.27% from 1970 through 1990, as shown below.

Exhibit 1: Operating Margins and Premium to Surplus Ratios

Year	Operating Margin	Prem:Surp Ratio	Year	Operating Margin	Prem:Surp Ratio	Year	Operating Margin	Prem:Surp Ratio
70	4.97	2.12	77	10.06%	2.49	84	-3.14%	1.86
71	9.25	1.87	78	10.90	2.33	85	-4.34	1.92
72	9.91	1.65	79	9.18	2.15	86	3.19	1.88
73	7.59	1.99	80	8.24	1.85	87	7.06	1.86
74	2.20	2.78	81	7.14	1.86	88	7.96	1.71
75	-0.67	1.52	82	4.52	1.72	89	4.89	1.56
76	4.21	2.47	83	2.47	1.67	90	5.11	1.58
Average (1970-1990):							5.27	1.94

The operating margin encompasses all sources of revenue, including investment income on both capital and policyholder supplied funds. To convert the return on sales (operating margin) to a return on surplus, one must multiply by the premium to surplus ratio. The ratio of written

premium to consolidated surplus has averaged 1.94 over this period, yielding an average return on surplus of 10.2%.[1]

Unearned Premium Reserve

Proper measurement of insurance income requires a matching of revenues (e.g., premiums) with expenditures (e.g., losses and expenses).

- *Earned Premiums:* Insurance premiums are generally booked at the inception of the policy period, before services have been rendered by the insurer. To match revenues and expenditures, premiums booked in one accounting period that provide for insurance coverage in a subsequent accounting period are held as "unearned premium reserves" on the liability side of the balance sheet. Earned premiums are the premiums booked minus the change in the unearned premium reserve.

- *Incurred Losses:* In most lines of business, losses and loss adjustment expenses are incurred evenly over the policy period. Incurred losses enter the income statement as the unearned premium liability runs off – that is, as the premium is earned.

- *Expenses:* Underwriting and acquisition expenses are incurred primarily at policy inception, and they enter the statutory income statement at that time, before the premium is earned. Thus, some underwriting and acquisition expenses are double counted in the earnings statement at policy inception: once as expenditures and once in the unearned premium reserve. The reserve runs off evenly over the policy period, so these expenses are counted only once at the expiration date.

GAAP and federal income tax accounting avoid this double counting of expenses. GAAP requires that a "deferred acquisition cost" asset be set up to amortize "costs that vary with and are primarily related to the acquisition of new and renewal insurance contracts" (FASB [1982], §28; AICPA [1990]). The "revenue offset" provision of the 1986 federal income tax amendments adds 20% of the statutory unearned premium reserve to income (Gleeson and Lenrow [1987]; Almagro and Ghezzi [1988]).

The treatment of underwriting and acquisition expenses in statutory statements affects the reported return on equity in two ways:

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[1] See Best's [1991]: Operating margins are from "% to Net Prem Earned" column of "Industry Operating Results" (page 124); policyholders' surplus [consolidated] from "Major Contributions to Investments" (page 124); net premiums written [not consolidated] from "total" column of "Aggregates of the Property-Casualty Business" (page 132). Consolidation affects assets and surplus, but not premiums written; unconsolidated figures show lower premium to surplus ratios. The averages are arithmetic averages. For operating results, some analysts would use the geometric average, which is slightly lower; see Panning [1987].

GAAP financial statements, showing GAAP equity, are not published by most mutual insurers and privately held firms; industry aggregates are not available even for publicly traded companies.

- Statutory surplus is generally less than GAAP equity, causing the return on surplus to be higher than the return on equity.[2]

- The change in the "equity" in the unearned premium reserve during the accounting period causes statutory income to differ from GAAP income. A growing insurer has a larger unearned premium reserve at the end of the accounting period than at the beginning. The "equity" in the reserve increases, statutory income is depressed, and the return on surplus is lower than the return on equity.

The net result of these two effects depends on

- the relative sizes of policyholders' surplus and the unearned premium reserve, and
- the growth rate of the company (see below).

Loss Reserve Discounting

Statutory accounting generally uses undiscounted values for Property/Casualty loss and loss adjustment expense reserves.[3] The IRS has used discounted loss reserves since 1987. GAAP accounting follows statutory practices, though the Financial Accounting Standards Board is now reconsidering this issue (FASB [1990]).

Again, there are two effects on the reported return on surplus:

- By raising liabilities, undiscounted reserves lower surplus and increase reported returns.[4]

- Both statutory and GAAP income are affected by the change in the unrecognized interest discount in loss reserves during the accounting period. A growing insurer generally has larger loss reserves at the end of the accounting period than at the beginning. As the unrecognized interest discount in the reserve increases, statutory income is depressed, and

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2 Rosenthal [1989] estimates that average GAAP equity is 25% greater than statutory surplus for Property/Casualty insurers.

3 Loss reserve discounting is permitted in statutory financial statements (1) for certain Medical Malpractice carriers (Yow, *et al.* [1990]), (2) in certain jurisdictions (e.g., MASSACHUSETTS INSURANCE CODE, §12, "Computation of Reserves of Liability Companies," paragraph 2: "For all compensation claims under policies written more than three years prior to [the Statement] date, the present values at four per cent interest of the determined and the estimated future payment"), and (3) when permission to discount is granted by the State Insurance Department.

4 Butsic [1990] estimates that discounting loss reserves raises equity by 20%. Lowe and Philbrick [1985] estimate that discounting reduces loss reserves by 15%, though they do not quantify the effect on surplus.

the return on surplus is lower than the return on economic net worth.[5]

The Cost of Equity Capital

Financial analysts consider the returns received by equityholders for the use of their funds. Accounting data, such as net income and policyholders' surplus, are used primarily by company management. Market data, such as stock prices and dividends, are used by investors.[6]

Two common procedures for estimating the cost of equity capital are the Dividend Growth Model (DGM) and the Capital Asset Pricing Model (CAPM). The Dividend Growth Model directly estimates the cost of equity capital, but it requires assumptions about future dividend payments. The CAPM relies on historical data, but its theoretical foundations are disputed by some analysts.

The Dividend Growth Model

What determines the prices of stocks? The stock certificate is a piece of paper, with no intrinsic worth. In a free market, of course, its value is determined by the forces of supply and demand: what others are willing to pay for it. But this only begs the question: What determines how much others are willing to pay for the stock certificate?

A stock certificate is a financial asset, like a bond. The worth of a bond is determined by the cash payments to the owner: semiannual coupons and the par value at maturity. At any time, the worth of a bond is the present value of these future cash payments.

A stock has three differences from a bond.

- First, the stock never matures: there are periodic dividends, but no "repayment of principal at maturity."
- Second, the dividend payments are less certain. If the firm faces financial difficulties, it may eliminate or reduce a dividend payment. If it earns unusually large profits one year, it may provide a larger dividend.
- Third, bond coupons have fixed amounts. Stock dividends are not fixed in nominal terms, but generally grow with monetary inflation and with the earnings of the firm.

If we knew the amounts of all future dividend payments, we could estimate the price of the stock

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5 "Economic net worth" denotes net worth as an economist might value a company. Kischuk [1986] defines "economic value" as "the present value of free cash flow, discounted using the company's cost of capital. Similarly, Woll [1987] examines insurance company profitability with "Expected Value Accounting," using present values of premium, loss, and expense cash flows. Economic net worth is closer to the market value upon which financial returns are evaluated than is the book value of either statutory or GAAP accounting.

6 On the cost of equity capital for insurers, see Haugen and Kronke [1971], Quirin and Waters [1975], Lee and Forbes [1980], and Cummins [1992].

as the present value of the future cash flows. The actual future dividends are uncertain, but we can use historical experience to forecast them. To determine present values, we must know the appropriate discount rate, which is the opportunity cost of equity capital. So if we know the current price, and we forecast future dividends, we can solve for the discount rate.[7]

Forecasting future dividends is a difficult task. To simplify, assume that the firm's earnings, assets, dividends, and stock price are all increasing at a constant rate. This growth rate, in combination with the dividend to price ratio, determines the cost of equity capital.

For example, suppose a firm is growing 10% per annum, its stock price increases at the same rate, and it pays an annual dividend at the end of each year equal to 5% of its stock price. What is the return to the equity holders in this firm?

Imagine an investor who buys a share of common stock for $100 on January 1, receives the dividend on December 31, and then sells the stock. (The $100 price is arbitrary; any price gives the same result.) On December 31, the stock price is $110 (10% per annum capital appreciation), and the dividend is $5.50. The annual return to the investor, or the cost of equity capital, is ($10 + $5.50) / $100, or 15.5% (Butters, et al. [1981], page 140).

Derivation of the DGM

In mathematical terms, let

K be the cost of equity capital,
D be the stockholder dividend at the end of the previous year,
P be the stock price at the beginning of the year, and
G be the anticipated (uniform) growth rate of stockholder dividends.

We assumed above that all financial characteristics of the firm, such as earnings, assets, stock price, and dividends, are growing at the same rate. This is the common situation, since dividends can not grow indefinitely if earnings do not keep pace. The mathematical derivation, though, needs only the growth rate of dividends (hence the name Dividend Growth Model).

On January 1, the investor pays P for the stock. If the firm grows 100G% per annum, he can sell the stock on December 31 for (P)(1 + G). In addition, he receives the stockholder dividend on December 31. The dividend the previous year was D, so this year it will be (D)(1 + G). The return to the investor, or the cost of equity capital, is

$$\{ (P)(1 + G) + (D)(1 + G) - P \} / P, \text{ or}$$

$$K = (D/P) (1 + G) + G.$$

A more rigorous derivation examines only future cash flows, the stockholder dividends. The price of the stock equals the present value of future returns. If dividends are growing at

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[7] On the Dividend Growth Model, see Gordon and Shapiro [1956], Sharpe and Alexander [1990], chapter 16, Weston and Copeland [1986].

100G% per annum, the future returns are D(1+G) in one year's time, $D(1+G)^2$ another year later, and so forth. Discounting these at the cost of equity capital ("K"), we obtain

$$P = D(1+G)/(1+K) + D(1+G)^2/(1+K)^2 + D(1+G)^3/(1+K)^3 + \ldots$$

Now $(x + x^2 + x^3 + \ldots) = x/(1-x)$ for positive $x < 1$. If dividends are positive, $K > G$, so

$$P = D \{ (1+G)/(1+K) \} / \{ 1 - [(1+G)/(1+K)] \}.$$

Simplifying this expression gives

$$P = D (1 + G) / (K - G), \text{ or}$$
$$K = (D/P) (1 + G) + G.$$

Both parameters of the dividend growth model, the ratio of stockholder dividend to stock price (or "dividend yield") and the anticipated dividend growth rate, are calculated or projected by investment firms for the major publicly traded stock companies. The dividend yield is generally stable from year to year. It now averages between 4% and 4.5% for Property-Liability insurers.

The anticipated dividend growth rate is a subjective estimate, for which investment firms provide differing forecasts.[8] Value Line's average projected rate for Property/Casualty insurers was 11% in 1989, implying a cost of equity capital of 16% [= (4.5%)(1.11) + 1.11].

Capital Asset Pricing Model

The Dividend Growth Model works best in an unchanging environment: inflation remains level, the firm grows steadily, and the economy expands slowly. If inflation accelerates suddenly, the economy enters a recession, or the firm's book of business changes rapidly, the Dividend Growth Model may not provide reasonable forecasts.

Consider the effects of inflation. If inflation accelerates, and investors seek the same return in inflation-adjusted dollars, then the *nominal* cost of equity capital will rise. But so will the nominal costs of other financial instruments, such as the coupon rate on bonds, or the mortgage rate on home loans.

Few pricing actuaries try to forecast future inflation or economic conditions. Instead, they seek a relationship between the cost of equity capital and some steady and accessible index. The Capital Asset Pricing Model (CAPM) provides such a relationship.

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[8] One cause of this is that the growth rate of a firm is inversely related to the dividend yield: "growth stocks" pay low dividends, whereas "income stocks" pay higher dividends but grow more slowly. The Dividend Growth Model is not suitable for an individual firm changing its business strategy and operations. It is more appropriate for industry average growth rates and dividend yields.

Price Fluctuation

The Capital Asset Pricing Model presumes that there are two types of influences on common stock price fluctuations. Some price changes are peculiar to the specific firm. For instance, the stock price for an oil company may increase if the company discovers an untapped oil source. Similarly, the stock price of an auto manufacturer may drop if its employees declare a strike.

A second influence on the prices of individual stocks is the movement in the stock market as a whole. During a "bull market," the prices of most stocks increase. The prices of some stocks are highly responsive to market movements: if the market as a whole goes up 12%, the prices of these stocks may increase 15%. The prices of other stocks are less responsive, and may increase only 10% during this period.

Price fluctuations that are peculiar to individual firms are referred to as *firm-specific*, *unsystematic*, or *diversifiable* risk. Price movements that reflect overall market returns are termed *systematic* or *undiversifiable* risk. The Capital Asset Pricing Model hypothesizes that

- The *expected* return from a common stock is related only to the stock's systematic risk;
- The difference between the *expected* return from a common stock and the return on a risk-free security is proportional to the firm's systematic risk; and
- The systematic risk and the factor of proportionality are relatively constant over time.[9]

Formally, the Capital Asset Pricing Model posits the following relationship:

$$R = R_f + \beta (R_m - R_f),$$

where R is the expected return on a given stock,
R_f is the risk free rate, such as the rate on Treasury bills,
R_m is the overall market return, and
β quantifies the undiversifiable or systematic risk associated with this stock.

The "market risk spread," or $(R_m - R_f)$, has averaged about 8.6 percentage points over the past 60 years, if R_f is the return on short term Treasury bill.[10] The β parameters, which reflect

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[9] See Sharpe [1970] and Lintner [1965]. Good introductions to the CAPM are Weston and Copeland [1986], chapters 16 and 17, Brealey and Myers [1988], chapter 9, or Cohen, Zinberg, and Zeikel [1982], pp. 143-241. For application of these concepts to insurance returns, see Williams [1983] and Cooper [1974].

[10] This figure uses the arithmetic average of the difference between stock returns and the return on Treasury bills. The averages from 1926 to 1986 are 12.12% for stock returns and 3.51% for T-Bills, for a difference of 8.61% (Sharpe and Alexander [1990], pages 5-6). Other analysts, such as Cox and Griepengrog [1988] and Quirin and Waters [1975], use

systematic risk, are estimated from historical data, and have averaged about unity for most Property/Liability insurers.

In sum, the Capital Assets Pricing Model estimates that the cost of equity capital for Property/Liability insurers is about 8.6 percentage points higher than the return on Treasury bills. The Treasury bill returns are readily available, and they closely track monetary inflation, economic prosperity, and other external conditions that affect the cost of capital.

Return on Surplus and the Cost of Equity Capital

For 1970 through 1990, the return on Treasury bills averaged between 7.5% and 8%, implying a cost of equity capital of about 16%, considerably higher than the statutory return on surplus of 10%. Insurers have argued that a 16% return on equity is needed to attract equity capital. Critics of the insurance industry have retorted that statutory experience shows 10% to be a reasonable return on surplus.[11]

During individual years, accounting returns on surplus are influenced by movements in underwriting cycles, reserve strengthening or weakening, and (for some definitions) the realization of capital gains and losses. Financial returns are affected by interest rate fluctuations and stock market changes. In the short run, the insurer's accounting return will diverge from the investor's financial return.

But if accounting returns are consistently lower than the opportunity cost of capital, as the historical experience implies, equityholders might withdraw their funds from the insurance industry and invest them elsewhere (Balcarek [1968]; Plotkin [1967]). Yet the opposite has occurred: despite low returns and unfavorable regulation in many states, the industry raised $32 billion in public stock and bond offerings from January 1985 through June 1987 (Matison [1987]).

Company Growth and Investment Income

Accounting statements combine investment income from past writings with underwriting income from the present book of business. If the company's growth exceeds its investment

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geometric averages, not arithmetic averages. The geometric averages are 9.98% for stock returns and 3.45% for T-Bills, for a difference of 6.53%. See Ibbotson and Sinquefield [1982], pages 57-61, for further discussion of when to use each type of average.

[11] See, for example, NAIC [1984], who infer from the low returns manifest in accounting statements that insurance is a low risk industry: "The property/casualty industry earned a below-average rate of return for most years since 1929. . . [This is] inconsistent with claims that the property/casualty industry is of above-average risk. . . . it seems valid to point to the historical returns as evidence of the industry's relative risk." Similarly, upon reviewing these historical returns for 1973 through 1987, the California Department of Insurance decided that for implementing the rate rollback provisions of Proposition 103, 11.2% was an appropriate return on surplus.

yield, then investment income from past writings is less than the expected investment income from the present book. The effect on operating margins is the product of three terms:

$$(G - Y) (Y) (K)$$

where

G = the growth rate in invested assets derived from insurance operations,
Y = the after tax investment yield (including capital gains and losses), and
K = the lag between premium collection and loss payment, or the "funds generating factor" (Kahane [1978]; Fairley [1979]).

One may use annual growth in premiums written, assets, or reserves to estimate the growth rate ("G"). Premium volume changes are distorted by underwriting cycle fluctuations and different growth patterns in losses and expenses (only the former correspond to invested assets). Loss reserve changes are influenced by industry wide strengthening and weakening. Asset changes are influenced by paid in capital, stock offerings, and capital market fluctuations.

The 1970-1990 annual growth rates in these three indices are 10.0% for premiums written, 12.3% for assets, and 14.3% for reserves. We select 12% as an average growth rate.[12]

The expected after tax investment yield is difficult to ascertain because of the large capital gains in the mid to late 1980's stock market and the federal income tax revisions in 1986. During 1985–1988, for instance, insurers showed an average investment yield of 7.0% and an average investment gain (realized capital gains, unrealized capital gains, and other gains) of 2.2%, for a total pretax return of 9.2% (Best's [1990], pages 51, 59). The economic prosperity and the stock market growth during these years contributed to this high return. Current yields are lower, though this reflects the recession and the low interest rates of the early 1990's. We select 6% as the long-term average after tax return.

The value of K is increasing as the percent of business in the long-tailed commercial liability lines grows. We select 2.5 for the value of K.[13]

Thus, Y = 6%, (G – Y) = 6%, K = 2.5, and the product of these three terms is 0.9%. This product may be interpreted as follows: investment income received now is derived from premiums collected two and a half years ago. Since there is a 6% difference (G – Y) between

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[12] The loss reserve growth rate reflects the lengthening payment lags in addition to growth in incurred losses. Asset growth was particularly high from 1984 to 1989 (13.8% per annum) reflecting stock and bond returns in addition to premium growth.

[13] This is Noris's [1985] estimate of the 1983 liability duration for an insurance portfolio of Automobile Liability, Automobile Physical Damage, Workers' Compensation, Multi-Peril, and General Liability, weighted in the same proportion as the overall industry portfolio. The lag between premium collection and loss occurrence lengthens this figure. The inclusion of the property lines of business and the effects of cash flow and installment premium payment plans shortens this lag. See also Woll [1987].

- the growth in invested assets due to growth in reserves and premium volume, and
- the growth in invested assets due to after tax compounding of the investment yield,

the expected investment income stems from an asset base 15% greater (= 6% *x* 2.5) than the asset base that produced the investment returns in the current year. With an investment yield of 6% per annum (Y), one must add 15% *x* 6% to the actual investment income to derive expected investment income from current operations.[14]

An Illustration

A simple illustration should clarify this phenomenon. Choose Y = 5%, G = 15%, and K = 2 years. Moreover, suppose that

- premiums are collected and losses are paid on July 1 of each year,
- premiums are $1 million on July 1, 1990,
- losses are paid two years after the receipt of premiums, and
- there are no expenses or taxes.

To simplify, we use cash basis accounting for investment returns with annual dividends or coupons.

In 1990, $1 million of premium is collected and the appropriate unearned premium and loss reserves are set up. No expenses are incurred, so the $1 million is invested at 5% per annum to yield $50,000 in 1991 and $52,500 in 1992, when the claims are paid.

In 1991, premiums are $1.15 million. The investment income received from these assets in 1992 is $57,500. In 1992, premiums are $1,322,500, though no investment income on these assets is received until 1993.

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[14] I am indebted to Robert Butsic for pointing out this phenomenon to me, and to Len Gershun and Gabriel Baracat for explaining its relationship to the difference between the growth rate and the rate of return (Butsic [1990], as well as Bingham [1992]). Similarly, Cummins and Chang [1983], pages 561-564, note that when the company growth rate exceeds the investment return, an accounting model may overstate the expected investment return.

Exhibit 2: Company Growth and Investment Income ($000)

	1990	1991	1992	1993	1994
Premium written	1,000.0	1,150.0	1,322.5	–	–
Investment income: on '90 premium	0	50.0	52.5	0	0
on '91 premium	0	0	57.5	60.4	0
on '92 premium	0	0	0	66.1	69.4
Total investment income received	–	–	110.0	–	–
Present value of future investment income	–	–	126.0	–	–

The present value of the investment income to be received in future years on the assets derived from 1992 premiums is

$$(\text{Assets} \times 0.05) / (1.05) + (\text{Assets} \times 1.05 \times 0.05)/(1.05 \times 1.05).$$

For assets of $1,322,500, this present value is $125,952. The actual investment income received in 1992 is $110,000, for a difference of $15,952, or 1.2% of premium. The estimate provided by (G - Y) (Y) (K) is (0.15 - 0.05)(0.05)(2) = 1%.[15]

Company Growth and the Unearned Premium Reserve

Business growth also increases the "equity" in the unearned premium reserve. [The "equity" is the deferred underwriting and acquisition expenses incurred and paid at policy inception and still unamortized on GAAP balance sheets.] Since deferred acquisition costs may not be capitalized in statutory financial statements (that is, the "equity" is not recognized), the increase in the equity is double counted in the income statement: once as an expense and once as a reserve addition. The effect on the operating ratio equals the ratio of the increase in the equity to earned premium, or

$$\frac{\text{Change in Equity}}{\text{Earned Premium}} = \frac{\text{(Growth Rate)(Unearned Prem Reserve)}}{\text{(Earned Premium)}} \times \frac{\text{(Equity)}}{\text{(Unearned Premium Reserve)}}$$

For 1970 through 1990, premiums have been growing at about 10% per annum. The ratio of unearned premium reserves to earned premium for all lines combined has been about 38.4% for 1977 through 1990, as shown in Exhibit 3. Before 1987, the ratio was about 40%; the

[15] The cash basis accounting used to simplify the example slightly overstates the discrepancy between actual and expected investment income.

decrease since then is due to the 1986 Federal Income Tax amendments.[16]

Exhibit 3: Earned Premium and Unearned Premium Reserves ($000,000)

Year	Unearned Premium Reserve	Earned Premium	Ratio
1978	31,367	78,738	39.8%
1979	34,561	86,917	39.8
1980	36,391	86,917	41.9
1981	38,194	97,465	39.2
1982	40,187	102,005	39.4
1983	42,303	107,224	39.5
1984	45,832	115,010	39.9
1985	56,850	133,342	42.6
1986	67,374	166,381	40.5
1987	72,302	188,989	38.3
1988	76,831	199,978	38.4
1989	79,941	206,669	38.7
1990	82,561	215,953	38.2
Average			39.8%

A rough estimate of the equity in the unearned premium reserve may be derived from Insurance Expense Exhibit data. Some expenses, such as commission, other acquisition expenses, and state premium taxes, are incurred when the policy is written. Other expenses, such as underwriting and administrative costs, are incurred partly when the policy is written and partly when the coverage is in force. The statutory procedure for estimating the equity in the unearned premium reserve, as described in the notes to the Insurance Expenses Exhibit, uses the ratio

$$\frac{\text{commission + other acquisition expenses + taxes, licenses, \& fees + (0.5)(general expenses)}}{\text{written premium}}$$

Industry expense data for 1990 provides the following figures in millions of dollars (Best's

[16] The ratio of unearned premium reserves to earned premium is available from Annual Statement data as page 3, line 9 divided by page 4, line 1. Until 1987, the full unearned premium reserve was an offset to taxable income. Since the timing of premium bookings had no effect on federal income taxes, many insurers even booked advance premiums, with an offsetting entry to unearned premium reserves. The revenue offset provision of the 1986 tax amendments allows only 80% of unearned premium reserves as an offset to taxable income. Booking premium more quickly increases federal income taxes. Insurers now avoid booking advance premiums, and they are shifting to premium payment plans and policy terms that allow later booking of written premium. For statutory accounting practices on the recording of certain premiums when billed or collected, see the minutes of the NAIC Emerging Issues (EX4) Working Group of June 4, 1990, and December 3, 1990.

[1991], pages 90-91, column 34, lines 2, 5, 6, 7, and 8:

$$\frac{24{,}598 + 12{,}994 + 6{,}972 + (0.5)(12{,}267)}{217{,}825} = 23.3\%.$$

The effect on statutory operating ratios caused by the double counting of acquisition expenses is

$$(0.100)\ (0.398)\ (0.233) = 0.93\%.^{17}$$

The combined effect of company growth on premium and loss reserves is 1.83 points of operating ratio. With a premium to surplus ratio of 1.94, this is 3.55 points of the return on surplus.

As noted earlier, the valuation of loss reserves at undiscounted amounts and the expensing of underwriting and acquisition costs when they are incurred decrease statutory surplus and raise the reported return on surplus. Loss reserve adequacy has the opposite effect. Lowe and Philbrick [1985] suggest that insurers implicitly discount their reserves, since they estimate an aggregate industry reserve deficiency about equal to the unrecognized interest discount.[18] Loss reserve discounting and reserve adequacy have opposite effects on the difference between the accounting return on surplus and the cost of equity capital.

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[17] NAIC [1984], Exhibits 8-5, 8-5, and A.8-3, show an average increase in prepaid expenses as a percentage of earned premiums of 0.7% for 1962 through 1981. Anderson [1972] models the effects of business growth on statutory earnings statements and concludes that "the prepaid acquisition expense adjustment can have a very significant effect on net income . . . especially . . . during periods of rapid growth and for firms issuing policies with longer durations" (page 207). See particularly the "Percent Return on Net Worth" columns in his Table 5 on page 209. Anderson uses an after-tax investment return of about 2%: his financial portfolio is two thirds bonds and one third stocks: three quarters of the bonds are tax exempt; and yields are 2% per annum for bond interest, 2% for stock dividends, and 3% for stock capital gains. For policies with annual terms (Anderson's "liability" rows), an increase in company growth from 5% per annum to 10% per annum has no effect on the "adjusted" return on net worth, but it reduces the statutory return on net worth from 6.01% to 5.56%. This difference is caused primarily by the change in the equity in the unearned premium reserve and to a lessor extent by the recording of reserves at undiscounted values. (See Anderson's Table 4 on page 208, columns "Prepaid Acquisition Expenses Adjustment" and "Excess Loss Reserve Adjustment.") Anderson also estimates the effect of not including unrealized capital gains and losses in the statutory earnings statement; see the "Unrealized Stock Appreciation Adjustment" in his Table 4 and the "Total Basis Percent Return on Net Worth" in his Table 5. The fluctuating stock market movements in the 1980's and the varying company strategies on realization of capital gains make these effects difficult to model.

[18] Lowe and Philbrick were writing at the nadir of the underwriting cycle, when industry loss reserves are weak. However, Cholnoky and Cohen [1989] and ISO [1989] find similar reserve deficiencies at year end 1988, the apex of the cycle.

The non-recognition of the equity in the unearned premium reserve lowers statutory surplus. In 1990, the industry reported unearned premium reserves of $82,561 million and policyholders' surplus of $138,401 million. The IEE estimate of the equity in the unearned premium reserve (23.3%) is $19,237 million, or 13.9% of surplus. Thus, the statutory return on surplus is understated by 2.16 points (= 3.55 – 1.39).

Other Factors

Company growth accounts for only a part of the disparity between accounting returns on surplus and estimates of the cost of capital. Several other items affect the statutory return on surplus.

1. Mutual and Stock Carriers The industry wide operating returns include both mutual and stock company experience, whereas the cost of capital estimates use only publicly traded stock company data. Differences between mutual and stock companies in (a) premium to surplus ratios, (b) operating profitability, and (c) dividends to policyholders affect the comparability of the accounting returns with the cost of capital estimates.

(a) Premium to Surplus Ratios: The premium to surplus ratio for stock companies was lower than the corresponding ratio for mutuals from 1969 to 1982, higher from 1983 to 1988, and lower from 1989 to 1990.[19] Using stock company figures would not give a substantially different accounting return on surplus.

(b) Operating Profitability: Stock companies have shown poorer underwriting performance than mutuals or reciprocals during the past 10 years. The 1981 to 1990 all lines underwriting ratios were –9.4% for stock companies, –7.0% for mutuals, and –5.5% for reciprocals.[20] If stock company figures are used for the accounting return on surplus, the average is slightly lower, increasing the disparity with the financial cost of capital.

(c) Policyholder Dividends: Most mutuals provide larger policyholder dividends than stock companies do. In 1990, the ratio of policyholder dividends to premiums earned was 0.9% for stock companies and 1.2% for mutuals (Best's [1991], pages 5 and 7). Mutuals are owned by their policyholders, so the policyholder dividend of a mutual is similar to the combined

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[19] The 1990 ratios of net premium written to policyholders' surplus were 1.208 for stock companies, 1.290 for mutuals, 1.685 for reciprocals, 0.707 for Lloyds organizations, and 1.264 for all insurers combined. These ratios use unconsolidated surplus figures, with no eliminations for interownership, and therefore differ from the 1.95 premium to surplus ratio cited above; see Best's [1991], page 132. A more thorough analysis would examine the premium to surplus ratios for major insurers, some of whom (e.g., State Farm) have unusually high or low ratios.

[20] Best's [1991], pages 141, 145, and 147. A more careful analysis would examine the underwriting ratios by line of business, since mutual company insurance portfolios are weighted toward the Personal Lines, which produce less investment income, whereas stock company insurance portfolios are weighted toward the Commercial Lines, which produce more investment income; see Roth [1992], pages 457-458.

policyholder and stockholder dividends of a stock company.[21] Using stock company dividend experience would raise the accounting return on surplus by about 1 percentage point.

2. Unrealized capital gains: Unrealized capital gains and losses are a direct charge or addition to surplus; they do not pass through the statutory earnings statement. This treatment generally depresses the statutory return on surplus when business volume is growing or when the industry's financial portfolio is shifting to common stocks. The lack of a deferred tax liability for the unrealized gains in statutory financial statements partially offsets this. (GAAP equity incorporates the deferred tax liability; see Berthoud [1988].) The combined effect depends on the growth rate of unrealized capital gains and the relation between realized and unrealized gains. If unrealized gains are stable from year to year and are offset by realized capital gains, the earnings statement is not significantly affected by inclusion or exclusion of unrealized gains, whereas the surplus account is depressed by the exclusion of the deferred tax liability. Conversely, if unrealized gains are increasing rapidly enough from year to year, the effect on the earnings statement is greater than the effect on surplus.[22]

3. Amortized bond values: Statutory accounting uses amortized values for bonds in good standing, raising their values above market during periods of increasing interest rates. This effect was great in the 1970's and early 1980's, though it has subsided in recent years, as interest rates have become more stable and as old bonds mature.

Amortization of bonds affects both reported earnings and surplus. As interest rates rise, the market value of bonds declines (Bierwag, Kaufman, and Toevs [1983]). Statutory accounting, which uses amortized values for bonds, shows no effect on either earnings or surplus. Market value accounting shows an earnings loss and a decline in surplus. The earnings loss reduces the reported return, and the decline in surplus increases the reported return. Unless there is a continual increase or decrease in interest rates, however, these effects are temporary.

Conclusion

The reported return on surplus of 10% is understated because of the interaction of company growth with statutory accounting practices. The 2.2% adjustment for growth, along with other needed adjustments (e.g., policyholder dividends, valuation of bonds), allows a more accurate assessment of accounting returns.

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21 Cf. the federal income tax procedure of dividing mutual life insurance company dividends between "policyholders as owners" and "policyholders as customers" (Saunders [1989]). On the "ownership" of mutual insurance companies, see Leckie [1979] and Trowbridge, Leckie, Margolin, and Roberts [1979].

22 NAIC [1984] calculates a 20-year average (1963-1982) of unrealized capital gains and losses as a percentage of mean total assets of 0.07%, with wide fluctuations from year to year; see Exhibit 8-4. Roth [1992] calculates the return on surplus as (the change in statutory surplus, plus stockholder dividends, less paid-in capital) divided by (beginning surplus), thereby avoiding the statutory income statement. This includes unrealized capital gains and losses, and Roth shows larger returns for the 1980's than shown in Exhibit 1 above.

This paper does not address the normative issues, such as: What is an appropriate return for insurers? Are insurers over- or under-earning? Should government agencies regulate insurers' profitability? In the past, the discrepancies between the accounting and financial rates of return have hampered objective consideration of these normative issues. Once the insurance industry's historical return has been properly quantified, these questions can be more fully examined.

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