UNDERWRITING CYCLES
AND
BUSINESS STRATEGIES

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 Casualty Actuarial Society in 1987, a CPCU in 1986, an Associate of the Society of Actuaries 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, and he is presently a member of the CAS Syllabus Committee. Previous papers and discussions 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:

Underwriting cycles, with their wide and puzzling swings in premiums and profitability, challenge the pricing actuary to knowledgeably adapt rates to market realities. Understanding the forces behind insurance price fluctuations is the precursor to adeptly predicting future market movements.

Analysts often ascribe underwriting cycles to actuarial rate making procedures, underwriting philosophy, or interest rate volatility. These interpretations do not withstand even casual scrutiny, portray insurance professionals as incompetent, and ignore the competitive pressures and business strategies that drive insurance pricing.

Underwriting cycles, like profit fluctuations in other industries, reflect the competitive interdependence of rival firms. Policyholder loyalty and demand inelasticity hold the allure of large returns, but the apparent ease of entry into insurance, the lack of market concentration, and the difficulty of monitoring competitors' prices preclude economic profits. The interaction of these forces keeps the market in disequilibrium, with continuing price oscillations.

The proficient actuary may no longer set rates based solely on indicated costs. Insurers seek actuaries who understand the competitive forces that drive market prices and who can set future rates that are most advantageous for the firm. They seek actuaries who can ride the underwriting cycle. **

UNDERWRITING CYCLES AND BUSINESS STRATEGIES

Table of Contents

לזכר נשמת ידידי
בנימין לפקוביץ
שהלך לעולמו

אל מלא רחמים שוכן במרומים
תמציא מנוחה נכונה תחת כנפי השכינה
במעלות קדושים וטהורים כזוהר הרקיע מזהירים
את נשמת בנימין לפקוביץ שהלך לעולמו
בעבור שנדרתי צדקה בעד הזכרת נשמתו
בגן עדן תהא מנוחתו
לכן בעל הרחמים יסתירהו בסתר כנפיו לעולמים
ויצרור בצרור החיים את נשמתו
ה' הוא נחלתו
וינוח על משכבו בשלום ונאמר אמן,

In memory of the soul of my friend,
Benjamin Lefkowitz:

Merciful God in heaven, grant rest under the wings of the Presence,
In the realms of the holy and pure, who shine as the gleaming sky,
To the soul of Benjamin Lefkowitz, who has passed on to the eternal world.

May the Lord of Mercy keep him in the shelter of his wings forever,
And bind him in the rolls of the living;
For God is his inheritance, and may he rest in peace in the Garden of Eden.

UNDERWRITING CYCLES AND BUSINESS STRATEGIES

SECTION 1: INTRODUCTION

The Education of an Actuary:

When I began work as a pricing actuary, I was struck by the anomaly of our rate making procedures. Actuarial techniques are cost-based: premiums are based on anticipated losses and expenses. Marketplace pricing, however, must consider supply/demand interactions, consumer desires, and competitive pressures. When I asked about this, I was told that actuaries determine the "proper" rates - those which best serve insurance companies and the public.

As the months passed, I learned that insurers do not actually set prices based upon actuarial indications. Schedule rating modifications of as much as 50% are used in the Commercial Lines, and discretionary rate deviations from actuarial indications are used in the Personal Lines. So I wondered: what is the use of our rate making procedures?

When I asked about this, I was told that the poor, misguided folk in Underwriting and Marketing always wanted lower rates. Management was forced to cut prices below adequate levels to keep everyone happy. Rate deviations and modifications were the random effects of strong officers in the field.

Years later, I understood that these deviations are not random. Underwriting cycles billow through our industry, raising and lowering the premium rates charged by insurers. The price fluctuations are not discretionary: insurers that have tried to "ride out" the cycle have lost both money and market share. Most important, these are industry wide cycles, unrelated to the internal politics of individual firms. Actuaries indicate rates, but the market sets prices.

Pricing in the Underwriting Cycle:

Many actuaries believe that rate indications should be based only on anticipated costs. Stable actuarial rates ensure adequate returns for insurers, and they mitigate the price variations that anger consumers. Carriers may be tempted by the marketing benefits of rate cutting, but actuaries should not encourage such follies.

How naive is this view! Cost-based pricing is rarely optimal. Careful consideration of the marketplace and of competitors' actions is essential for ensuring profitable operations. And this aforementioned view is dangerous to our Actuarial Society as well. For if actuaries ignore

market realities, their companies relegate them to technical busy-work. If we wish to influence actual prices, we must address practical business concerns.

The view described and deprecated above is ensconced in two prevalent convictions: First, underwriting cycles are seen as external to insurer strategies. For example, the severe downturn in Commercial Lines operating income during the early 1980's is often attributed to high and fluctuating interest rates that encouraged "cash flow" underwriting. How can we price for these variations if we can not control or even predict them?

Second, underwriting cycles are considered unrelated to profit cycles in other industries. Some say that our profits are countercyclical to general business conditions: rates are high during depressions and decline during prosperous periods. Others add that our cycles vary with supply restraints, not demand pressures. Pricing techniques used in other industries are therefore inapplicable to insurance rate making.

The task of this paper is to uncover the true nature and causes of underwriting cycles. This inquiry is extensive, for profit cycles are complex phenomena. The implications for actuaries are of two sorts. First, if we can better predict the course of the cycle, we can set rates accordingly. For instance, one should not file for a rate increase when competitors are about to cut prices. And one must be prepared to raise rates quickly once the cycle has passed its nadir. The essence, of course, is to anticipate the movements of the cycle, not simply to follow its flow.

Second, if we understand the causes of the cycle, we can set prices to nudge its course. For instance, when the cycle turns down, will a large rate cut hasten the return to profitability? Or will it only increase the pain of operating losses? Insurers that can confidently answer these questions will fare better in the competitive marketplace.

The Structure of this Paper:

This paper is organized as follows: Section 2 discusses the nature of underwriting cycles, the lines of business most subject to profit fluctuations, and the overall returns achieved by the insurance industry. The next three sections examine prevalent industry interpretations of these cycles. Section 3 reviews rate making explanations: data lags and countercyclical economic forces. Section 4 looks at underwriting philosophy: industry-wide optimism and pessimism, rational expectations, and cobweb theories. Section 5 considers financial conditions: interest rates, investment returns, and "cash flow" underwriting.

Section 6 turns to economic theory: competition, Nash equilibria, and conjectural variation. Section 7 reviews the characteristics of the insurance marketplace: product differentiation, barriers to entry, and consumer loyalty. Section 8 provides practical emendations to several idealized economic hypotheses, such as unerring rationality, perfect knowledge, and unobserved competitive responses.

Section 9 presents a model of underwriting cycles, based on insurer strategies and consumer characteristics. Section 10 considers the model's implications: the severity of these cycles and

the lines of business most subject to them. Section 11 is devoted to public policy: how might one mitigate these cycles - and should one even try?

The Journey Ahead:

Several comments are useful before we embark. First, this inquiry takes us through both hard and "soft" sciences: finance, industrial economics, business theory, and underwriting philosophy. So take care: do not limit yourself within exacting mathematics, such as "Bayesian credibility" or "underwriting *betas*," when setting rates, for the market knows no such constraints.

Second, be skeptical of all assertions in this paper, question the conclusions offered here, and seek alternative explanations for each phenomenon. But do not reject interpretations for lack of rigorous "proofs." Business strategies and competitive conditions can not be easily quantified. You must examine the reasonableness, validity, and usefulness of the arguments. But do not seek theorems, for there are none here.

Third, no interpretation of social behavior is final. The model presented here, of underwriting cycles based on insurer strategies, is but one interpretation among many. For some situations, it fits well; for others, it may not. The question you must ask yourself is, "Does this analysis of underwriting cycles help me price insurance products?" I hope it does.

SECTION 2: THE NATURE OF UNDERWRITING CYCLES

To understand the causes of underwriting cycles, we must first examine their nature. How regular, frequent, and severe are they? What lines of business do they affect? How have they changed over the past twenty years?

This section covers several issues. The first is the *measurement of income*. The underwriting cycle derives its name from periodic fluctuations in underwriting gains and losses. But insurance profitability depends on total operating income, both underwriting returns and investment returns. In fact, the industry has suffered underwriting losses during most of the past two decades. Underwriting income alone is not a good measure of profits.

Investment income is steadier than underwriting returns, so the industry's operating income follows the same course as its underwriting profits. Yet the total return to the insurer is essential for our analysis, since fluctuations in this return reflect the *severity* of the cycle: "How profitable is the insurance industry during its good years? And how unprofitable is it during its bad years?"

Accounting income is a *post hoc* measure: it reveals prior results, not current actions. But

insurance managers need not examine their books to learn which way the cycle is moving; they see the cycle's effects daily "on the street." So we turn to *what happens* during the underwriting cycle. Increased profits may be due to (a) greater demand, (b) lower costs, or (c) price fluctuations *independent of demand and costs*. Note carefully: we are not yet trying to explain the underwriting cycle. We simply seek to ascertain what it is we are examining.

Finally, we consider which *lines of business* have been most susceptible to the cycle during various historical periods. Rate making procedures and underwriting philosophy are similar for the various insurance products. But the emphasis in this paper is on competitive pressures and business strategies, and these differ for each line.

The Measurement of Profits:

Underwriting income is a measure of the return on sales (or premium). Specifically, the

underwriting profit margin = 1 - loss ratio - expense ratio, where

loss ratio = (incurred losses + loss adjustment expenses) / earned premium, and
expense ratio = (administrative + acquisition expenses) / written premium.

Underwriting gains and losses are a poor measure of profitability, for two reasons. First, premiums are generally collected at the inception of the insurance policy. Losses are incurred (on average) at the midpoint of the policy and may not be paid until much later. The average General Liability loss, for example, is paid four or five years after the policy's inception.[1] The premiums are invested by the insurer during this time, though the investment returns are not reflected in the underwriting gains and losses.

Second, a margin on sales is a meaningful measure of profitability only when coupled with an *asset turnover rate* and a *degree of financial leverage*.[2] But insurers have no physical capacity constraints, so the asset turnover rate and the degree of financial leverage vary from firm to firm. In fact, since almost all losses and most expenses are subsequent to premium collection, the "production" of a policy produces a net cash inflow. Insurers are free to choose premium to

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[1] This is a dollar weighted average. Most small losses are paid quickly, but complex GL claims may not be settled for 10 years or more. See Richard G. Woll, "Insurance Profits: Keeping Score," in *Financial Analysis of Insurance Companies* (Casualty Actuarial Society 1987 Discussion Paper Program), page 510.

[2] This is the *Du Pont* analysis of financial ratios: profitability is the product of the margin on sales, the asset turnover rate, and the degree of financial leverage. See J. Fred Weston and Thomas E. Copeland, *Managerial Finance*, Eighth Edition (Chicago: The Dryden Press, 1986), pages 228-235.

surplus (that is, sales to equity) ratios based upon their particular business strategies.[3] For the individual firm, margins on sales do not necessarily correspond to returns on equity.

Industry investment returns change slowly from year to year.[4] *Relative* underwriting gains by year correspond closely to *relative* operating profitability, as shown in Figure 1.[5]

Figure 1: Underwriting and Operating Income (industry-wide)
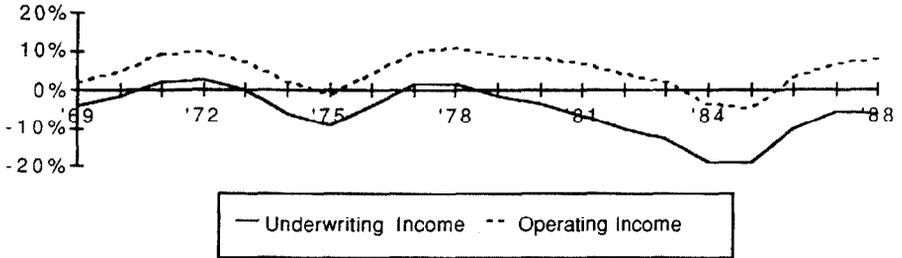
The average net operating income for 1969-1988 was 5.15%. Although this figure includes investment returns, it is still a margin on sales. Industry wide average premium to surplus

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[3] State regulators do recommend limits on premium volume as a multiple of policyholders' surplus. A premium to surplus ratio greater than 3 to 1 entails failure of the NAIC IRIS test #1. However, insurers are not required to abide by these recommendations, and actual premium to surplus ratios vary widely in the industry.

[4] In particular, interest, dividends, and rents are stable; realized and unrealized capital gains and losses fluctuate more widely.

[5] See Best's *Aggregates and Averages*, 1989 Edition, (Oldwick, NJ: A. M. Best Corporation, 1989), page 86. These are calendar year figures, and so do not reflect loss reserve strengthening and weakening. For instance, the difference between 1984 and 1987 in *reported calendar year* underwriting income is about 13 points. Goldman Sachs estimates that the *true accident year* difference is about 26 points: "The difference between the initial and latest estimates for the 1984 accident year accident year combined ratio shows how much companies understated their true losses: 115.5% versus 124.7%. On the other hand, the 1987 accident year has developed favorably from 100% to 98.2%. The difference between the 1984 and 1987 calendar year combined ratios was only 13.4 points: 118.0% and 104.6% respectively." See Thomas V. Cholnoky and Jeffrey Cohen, *Property/Casualty 10K Loss Reserve Disclosures* (Goldman Sachs, May 31, 1989), page 3.

were 2.13 for 1969-1978, and 1.85 for 1979-1988 (see Figure 2).[6] Using the latter figure, the return on surplus is about 9.53%.[7]

Figure 2: Premium to Surplus Ratio (Consolidated)
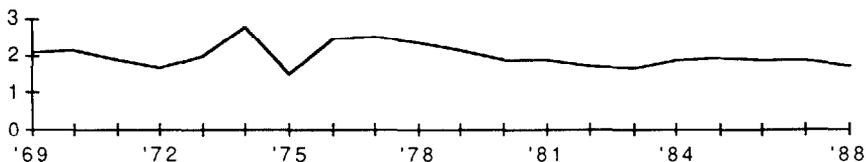
Statutory Financial Statements:

This 9.5% return is *overstated* because of statutory accounting principles and *understated* because of the timing of investment and underwriting income. Best's *Aggregates and Averages* shows policyholders' surplus, not GAAP equity. But statutory accounting, the basis for policyholders' surplus, uses undiscounted reserves, and it expenses acquisition costs when they are incurred. Both practices overstate liabilities and understate surplus. GAAP equity is generally larger, so the overall return on equity is lower.[8] [9]

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[6] See Best's *Aggregates and Averages*, 1989, *op. cit.*, page 84.

[7] The California insurance department recently calculated an 11.2% historical return on equity for the industry. The time period used, the premium to surplus ratio, and the method of calculation account for the difference from the ratio determined here.

[8] Conversely, recording bonds in good standing at amortized values and ignoring the Federal Income Tax liability for unrealized capital gains often overstate policyholders' surplus, though this effect is smaller than the one discussed in the text. The effects of statutory versus GAAP accounting on *net income* are also small. For instance, statutory net income is reduced in a growing company by expensing acquisition costs when they are incurred. For a thorough comparison of statutory surplus and GAAP equity, see John R. Berthoud, "Generally Accepted Accounting Principles," in R. W. Strain (ed.), *Property-Liability Insurance Accounting*, third edition (Wingdale, NY: Strain Publishing, Inc., 1986), pages 310-323.

[9] The *return on equity* is actually a nebulous concept in insurance. Utilities and manufacturers have "used and useful" capital: the factories and equipment which produce the product. But insurers require no fixed assets to issue policies. Their assets consist of stocks and bonds, which "support" their insurance writings.

There is little agreement on how much surplus is needed by an insurer. Paul Joskow argues

The timing of investment and underwriting income in statutory financial statements depresses reported operating returns. Note that *cost of equity capital* estimates for the insurance industry, whether derived from dividend growth models or the Capital Assets Pricing Model, show investor expectations of about 16% returns on insurance industry stocks in the 1980's.[10] This figure should equal the long term return on equity, though it is substantially higher than the figures in statutory financial reports.

Company Growth and Returns on Equity:

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 yield, then investment income from past writings is less than the expected investment income from the present book.* The distortion in operating returns on accounting statements is the product of three terms:

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

where G = Growth rate in invested assets derived from insurance operations,
    Y = After tax investment yield (including capital gains and losses), and

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that the overcapitalization of the insurance industry accounts for its low return on equity. See his "Cartels, Competition, and Regulation in the Property-Liability Insurance Industry," *The Bell Journal of Economics and Management Science*, Volume 4, no. 2 (Autumn 1973), pages 375-427. Others believe that the high insolvency rates among Property/Liability insurance carriers demonstrate an undercapitalization of many firms.

From a financial perspective, returns on equity are as appropriate for stock insurance companies as for other publicly traded firms. But the financial analyst looks at stock market values to determine price/earnings ratios. We are concerned here with the profitability of the insurance firm, not with the return to the investor in insurance stocks. To see the difference, consider a pure monopoly faced with an unvarying demand curve in a low risk industry. The firm's earnings will be high, since it controls the entire market. But the returns on its stock will be low, since there is little risk for the investor.

Note the difference between financial and economic analyses. Investors bid up the price of the firm's stock, so the market return on equity is low. But the firm's *price-cost margin* remains high, since it has a monopoly in its industry.

[10] See, for instance, the estimate of the National Council on Compensation Insurance for its Internal Rate of Return pricing model, in NCCI Actuarial Operations memorandum AC-47 (July 25, 1989), Exhibit 27-1.

K = Lag between premium collection and loss payment (the "funds generating factor").[11]

Invested assets derived from insurance operations are approximately equal to discounted loss reserves plus the unearned premium reserves, minus the equity in the latter reserve. Since insurance loss costs are increasing more rapidly than market investment yields, G is generally larger than Y.

One may use annual growth in premiums written, assets, or reserves to estimate G. Premium growth 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 and by stock offerings.

The 20 year average of annual growth in these three indices is 11.1% for premiums written, 11.9% for assets, and 12.7% for reserves.[12] We choose 12% as a reasonable estimate.

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 changed federal income tax laws after 1986. For 1984-1988, Best's *Aggregates and Averages* shows an average investment yield of 7.8% and an average investment gain (realized capital gains, unrealized capital gains, and other gains) of 1.7%, for a total of 9.5%.[13] The economic prosperity and the continuing stock market growth in the 1980's influence this high return. We select 6% as the average 20 year after tax return.

The value of K is increasing as the long-tailed commercial liability lines grow, but this change is steady. We select 2.5 for the current value of K.[14]

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[11] See Yehuda Kahane, "Generation of Investable Funds and the Portfolio Behavior of the Non-Life Insurers," *Journal of Risk and Insurance*, Volume 45, No. 1 (March 1978), pages 65-77, or William Fairley, "Investment Income and Profit Margins in Property-Liability Insurance: Theory and Empirical Results," *The Bell Journal of Economics* 10 (Spring 1979) pages 192-210, reprinted in J. David Cummins and Scott E. Harrington (eds.), *Fair Rate of Return in Property-Liability Insurance* (Boston: Kluwer·Nijhoff Publishing, 1987), pages 1-26.

[12] See Best's *Aggregates and Averages*, 1989, *op. cit.*, page 88.

[13] See Best's *Aggregates and Averages*, 1989, *op. cit.*, page 49.

[14] This is Peter Noris's 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 proportions as the overall industry portfolio. See his *Asset/Liability Management Strategies for Property and Casualty Companies*, (Morgan Stanley, May 1985). The lag between premium collection and loss occurrence would lengthen

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 the difference between growth in invested assets due to growth in reserves and growth in invested assets due to after tax compounding of the investment yield is 6%, the *expected* investment income is based on an asset base 15% greater (= 6% * 2.5) than the asset base the produced investment returns in the current year. With an investment yield of 6% per annum, one must add 15% * 6% to the actual investment income to derive *expected* investment income based on the present asset base.[15] [16]

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this figure. The inclusion of the property lines of business and the incidence of cash flow and installment premium payment plans would shorten this figure.

[15] Robert Butsic first pointed out this phenomenon to me; he estimates a somewhat greater magnitude of this distortion. Len Gershun and Gabriel Baracat, using an internal rate of return model, showed that the strength of this phenomenon depends on the difference between the growth rate and the rate of return.

[16] Even after these adjustments, the disparity between Best's returns on surplus and estimates of the cost of capital is large. Several other factors contribute to this:

(A) In determining the risk premium for the Capital Assets Pricing Model, many analysts use the arithmetic average of the difference between stock returns and the return on a risk free security, such as Treasury bills. The arithmetic averages from 1926 to 1986 are 12.12% for stock returns and 3.51% for T-Bills, for a difference of 8.61%. See William F. Sharpe and Gordon J. Alexander, *Investments*, Fourth Edition (Englewood Cliffs, NJ: Prentice Hall, 1990), pages 5-6.

It has been argued that proper analysis requires the use of 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%. Thus, cost of capital estimates derived from the Capital Assets Pricing Model may be 2 points overstated. See, however, Roger C. Ibbotson and Rex A. Sinquefield, *Stocks, Bonds, Bills and Inflation: The Past and the Future* (Charlottesville, Virginia: The Financial Analysts Research Foundation, 1982), pages 57-61, for a defense of the arithmetic average for one year forecasts.

Statutory accounting statements are not as greatly affected by this difference. The arithmetic average of insurance industry operating returns over the past 20 years is 5.15% and the geometric average is 4.66%.

(B) The industry wide operating returns include both mutual and stock company experience. The cost of capital estimates uses only publicly traded stock company patterns. Differences in (a) premium to surplus ratios, (b) operating profitability, and (c) dividends to policyholders between mutual and stock companies affect the comparability of the accounting returns versus

We return to the overall industry return in Section 7. First, however, we consider the regularity and severity of the cycles.

Regularity and Severity of Underwriting Cycles:

The insurance industry shows a steady oscillation of net income between profitable and adverse periods. Historically, underwriting cycles have lasted about 6 years apiece, though the most recent one, from late 1975 to early 1985, spanned almost 9 years.

Insurance personnel never ask *if* there will be another cycle. The questions are only *when* it will come and *how severe* it will be.

Indeed, the severity of the cycle is surprising. Net income in 1975, 1984, and 1985 was negative, and revenue in many other years was well below marginal cost.[17] Economists presume that economic profit margins will not remain negative in a competitive industry with easy entry and exit. Property/Liability insurance is marked with competitive characteristics, so why are profits so meager for so many successive years?

Moreover, accounting data conceal the true severity of the cycle. Most firms desire steady

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the cost of capital estimates.

Since 1983, stock companies have had a higher premium to surplus ratio than mutual companies, largely due to State Farm's vast surplus. However, the stock company average is similar to that of the entire industry, since reciprocals hold small surpluses. See *Best's Aggregates and Averages, op. cit.*, page 88 for stock, mutual, and reciprocal figures, and page 84 for consolidated totals.

Stock companies have shown poorer underwriting performance than mutuals or reciprocals during the past 10 years. Best's shows average all lines *underwriting* ratios for 1979-1988 of -8.8% for stock companies, -5.5% for mutuals, and -4.4% for reciprocals. (See *Best's Aggregates and Averages, op. cit.*, pages 103, 107, and 109.) Thus, if one used only stock company figures in the accounting return on surplus, the average would be lower, increasing the disparity with the financial cost of capital.

Mutuals provide larger policyholder dividends than stock companies do. In 1988, the ratio of policyholder dividends to premiums earned was 0.9% for stock companies, 2.0% for mutuals, and 1.4% for the industry as a whole. (See *Best's Aggregates and Averages, op. cit.*, pages 3, 5, and 7.) Thus, using only stock companies would raise the accounting return on surplus by about 1 percentage point.

[17] Marginal cost includes a reasonable profit to compensate investors for the use of their capital.

earnings, particularly if their financial statements are scrutinized by government regulators or by stockholders. Insurers tend to under-reserve during poor years, thereby increasing net income. Conversely, when profits improve, insurers strengthen reserves of prior years, dampening their reported earnings.[18]

In sum, insurers expect severely fluctuating profits: dismal returns during some periods, compensated by high returns in other periods. But even more surprising is the lack of an objective cause of these cycles - the topic to which we now turn.

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[18] Robert Butsic notes the same phenomenon: "Examining historical data reveals that the real accident-year cycle is even wilder than published calendar-year loss ratios indicate. This suggests reserving is a problem: insurers under-reserve when results are worsening and over-reserve when profits improve. It isn't clear whether management is overruling actuarial indications or actuaries are bowing to pressures to smooth reported income." See Robert P. Butsic, "The Underwriting Cycle: A Necessary Evil?" *The Actuarial Digest,* Volume 8, No. 2 (April/May 1989), page 15.

The Goldman Sachs investment firm observes: "Accuracy and adequacy [of loss reserves] tend to fluctuate over the course of the underwriting cycle. . . . Companies typically underreserve current accident years during a downcycle. They may also release prior accident year reserves to support earnings. In an upcycle, companies reverse this process: they overreserve current accident years and strengthen prior years." See Thomas V. Cholnoky and Jeffrey Cohen, *Property/Casualty 10K Loss Reserve Disclosures* (Goldman Sachs, May 31, 1989), pages 1-3.

Similarly, Conning and Company show reported and restated underwriting cycles in *The Real Property & Casualty Cycle: Behind the Reported Results* (Conning & Co., December 1987). They conclude: "Behind the reported underwriting cycle lies a more severe accident-year cycle" (page 2).

Kevin Ryan and Richard Fein, executives of the National Council on Compensation Insurance, chronicle this process in Workers' Compensation: "Changes in reserve adequacy tend to occur in cycles. . . . A period of relative reserve strengthening occurred between 1977 and 1981. This was followed by a period of declining adequacy from 1982 through 1985, when reserve weakening equal to more than 40% of premium took place. In the period 1986 through 1991, we expect that reserves will once again be strengthened, as the cyclical process continues. . . .

"The stages of the cycle appear to be restorative; that is, the reductions in adequacy on the downside are compensated by roughly equal increases once reserve strengthening resumes.

"The impact of reserve changes on the loss ratio is obvious . . . : they make bad years look better and good years look worse than they actually were. At the beginning of this cycle, from 1978 through 1981, extremely good results were obscured by modest reserve strengthening. In the following four years the opposite condition prevailed: the very dismal accident year results were masked by significant reserve weakening. As the cycle progresses, we see further reserve strengthening, which should persist into the 1990's." See Kevin M. Ryan and Richard I. Fein, "A Forecast for Workers Compensation," *NCCI Digest,* Volume III, Issue IV (December 1988), pages 47-48.

What Drives the Cycle?

In other industries, profit variations are often attributed to demand fluctuations or "supply shocks." Consider durable goods, for which demand varies from year to year. During recessions, individuals maintain their current automobiles and homes; during prosperous periods, they purchase new ones. Profits of automobile manufacturers and construction contractors vary in tandem with demand.

Demand for insurance coverage, however, remains steady from year to year.[19] *For some risks,* such as those in Workers' Compensation and Personal Automobile liability, compulsory insurance statutes and Financial Responsibility requirements make coverage essential. For other lines, such as Personal Automobile Physical Damage and Homeowners', lending requirements have a similar effect, since many financial institutions require insurance on new purchases before they will authorize loans. Moreover, durable goods can be reused year after year. But insurance can not be stored; the policy must be renewed at its expiration. In sum, insurance is a perishable necessity. Demand is steady; it does not cause profits to fluctuate.

"Supply shocks" denote sudden and unexpected shifts in the available quantities of a product. For instance, poor weather conditions, such as droughts or frosts, decrease the supply of crops or fruits and raise their prices.[20] But supply shocks rarely affect insurance capacity.[21] *Loss*

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[19] Compare Kaye D. James, "Underwriting Cycles in the Property-Casualty Insurance Industry," in *Inflation Implications for Property/Casualty Insurance* (Casualty Actuarial Society 1981 Discussion Paper Program), pages 246-284: "Cyclicality is certainly not unique to the property-casualty industry; most industries are subject to fluctuations. The difference lies in the relationship between changes in supply and demand. Many industries are subject to variations in demand, and the corresponding supply reactions result in swings in prices and profits. . . . The demand for property-casualty insurance is a function of real economic activity, and, as such, tends to increase slowly over time in a fairly stable fashion. The supply of property-casualty insurance, however, is very volatile."

[20] Otto Eckstein and Allen Sinai, "The Mechanisms of the Business Cycle in the Postwar Era," in Robert J. Gordon, (ed.), *The American Business Cycle: Continuity and Change*, National Bureau of Economic Research , Volume 25 (Chicago: The University of Chicago Press, 1986), pages 39-105, note that "at least four supply shocks can be identified as having played a major contributing role in particular business cycles." They list the steel strike of 1959, the world oil disruptions in 1973 and in 1979-80, and the poor crop yields in 1972.

[21] Legal decisions and legislative enactments are exceptions to this assertion, since they may radically change expected losses. For instance, judicial expansions of pollution coverage in General Liability policies, and Congressional decrees of joint, several, and retroactive liability for certain environmental damages, precipitated the industry's curtailment of pollution

costs drift steadily upwards; they do not show the zig-zag effects of supply shocks.

In sum, external factors do not drive the underwriting cycle. Rather, insurers raise and lower premium rates, and profits follow accordingly. When asked why they do so, they reply: "To meet the competition."

Note two items. First, there are no observable causes for "capacity crunches" or rate cutting. Rather, the cycle is internal to the industry. Second, the cycles seem connected with the competitive characteristics of the insurance marketplace. The cycle may be internal to the industry, but the actions of any individual insurer are constrained by those of its rivals. We will return to these issues below.

Lines of Business

Cycles affect most Property/Liability insurance lines, but in varying degrees. From 1950 through the late 1970's, the overall industry cycle tracked closely that of automobile insurance. Workers' Compensation also showed strong and regular profit fluctuations.[22]

The 1980's, however, produced steadier returns in these lines. The wide profit swings are evident instead in Commercial Liability insurance: Commercial Auto, General Liability, and Medical Malpractice, as shown in the accompanying charts.[23]

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coverage. This is similar to a "supply shock."

[22] See Section 10 below.

[23] See Best's *Aggregates and Averages*, 1989, *op. cit.*, pages 97-99. The "all lines combined" operating ratios in *Best's Aggregates and Averages on* page 99 (not reproduced here) differ from the industry operating results shown above for two reasons: (1) Best's uses expense ratios to net premium written for the by line exhibits, but ratios to net premium earned for the industry operating results. (2) Best's shows substantially higher net investment income for the industry operating results, since only investment income allocated to lines of business is included in the "by line" exhibits.

Figure 3: Underwriting Cycles: Pers Auto and Work Comp

Legend:
— Pers Auto Liab
— Pers Auto PhD
-- Work Comp
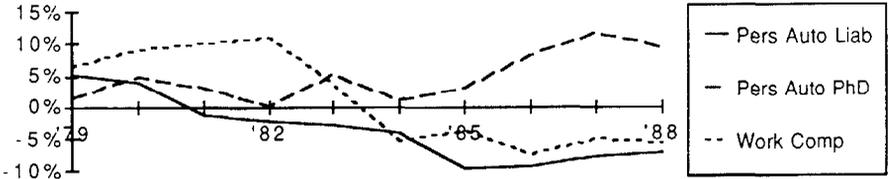
Figure 4: Underwriting Cycles: Comm Liability Lines

Legend:
— Gen Liab
— Comm Auto Liab
-- Med Mal
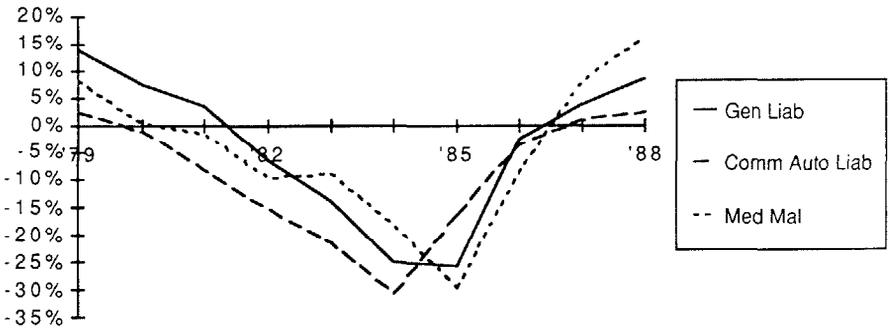
During the past decade, Commercial Automobile, General Liability, and Medical Malpractice exhibited more severe cycles than did Private Passenger Automobile or Workers' Compensation. In 1984 and 1985, operating ratios for the Commercial Liability lines climbed to 125-130%, whereas those for Automobile and Workers' Compensation remained below 110%.

During the mid-1980's, "cash flow underwriting" was an oft-cited explanation for the poor operating results. The long-tailed Commercial Liability lines were most susceptible to illusory investment expectations and therefore produced the worst underwriting returns.

We discuss "cash flow underwriting" in detail in Section 5. For now, note simply that (1) Workers' Compensation has a longer tail than Commercial Automobile; (2) "Cash flow underwriting" is unrelated to the downward movement of the cycle in the *late* 1980's; (3) This explanation presumes that the insurance industry is populated by consistently poor investment managers; and (4) Since the average duration of the Property/Liability insurance industry's assets is longer than that of its liabilities, a drop in new money interest rates should aid

insurers, not hurt them. High interest rates explain the low *underwriting* profits in the long-tailed lines, but they are not the cause of the *cycles*.

The following three sections review the traditional explanations for underwriting cycles, from actuarial, underwriting, and investment perspectives. None of these interpretations proves satisfactory, but they all help delineate the problem. We then turn to business strategy, profit opportunities, and competitive pressures, for a more discerning understanding of the cycle and the lines of business that it affects.

SECTION 3: INTERPRETATIONS OF THE CYCLE: ACTUARIAL RATE MAKING

Underwriting cycles do not pass unnoticed. Over the years, they have elicited numerous explanations by industry personnel and outside observers. The following sections review three of the most prevalent interpretations, which ascribe underwriting cycles to (1) actuarial rate making procedures, (2) underwriting optimism and pessimism, and (3) investment returns.

Each of these explanations sheds light on the nature of the cycle. But each also implicitly portrays our industry as composed of incompetent actuaries, underwriters, or financial analysts, failing to accurately make rates, write policies, or invest monies, and unable to learn from past mistakes. These interpretations misunderstand profit cycles, which are driven not by the errors of bumbling managers but by the competitive strategies of rival firms.

Uncertainty and Counter-Cyclicality:

Some observers ascribe profit cycles to the uncertainty and counter-cyclicality of insurance loss costs: (1) Property/Casualty insurance costs depend upon both *random* loss occurrences and *uncertain* macroeconomic and social trends. For random losses, think of unusual weather disturbances, such as windstorms and earthquakes. For social trends, think of unpredictable legal changes, such as retroactive liability for pollution exposures.

(2) The *counter-cyclicality* of insurance loss costs stems from the time lag between the compilation of historical experience and the implementation of new rates. Generally, two or more years of experience are used for rate making, losses are developed three months beyond the end of the experience period, systems processing of the historical data requires about three months, rate analysis and filing take six months, and the rates remain in effect for one year. Thus, the time between the average loss date in the experience period and the midpoint of the effective period of the new rates is three or more years.[24]

The uncertainty and counter-cyclicality of insurance loss costs contribute to underwriting cycles. During recessions, loss cost inflation is moderate, automobile travel is low, jury

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[24] Rating bureaus require an additional six months to a year, for editing and verification of insurance data, and for notification to member companies of intended rate filings.

awards in liability cases are less liberal, factories operate below capacity, industrial injuries are infrequent, and so forth.[25] The experience from this period, and the time lag between data compilation and rate implementation, ensures relatively constant rates for the ensuing several years.

The economy soon recovers, and loss costs rise rapidly. Insurers, wary of increasing rates, ascribe the mounting costs to random loss occurrences. Even when the true rate inadequacy is recognized, and rate revisions are requested, the time lag between data compilation and rate implementation means that the needed premiums are not earned until several years later.

Historical experience continues to indicate a rate inadequacy when the economy once again slides into a recession. Insurers continue filing for rate increases, even though rates have returned to adequate levels. And so the cycle goes on.[26]

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[25] There are opposing influences as well. During recessions, thefts increase, leading to higher automobile comprehensive claims. Employees recently laid off are more likely to file Workers' Compensation claims for partial injuries, since there is no loss of regular income while on disability. In addition, Workers' Compensation claim severity increases, since it is more difficult to find replacement jobs for injured employees.

Unfortunately, little is known about the correlations between insurance loss costs and macro-economic conditions. William Fairley, "Investment Income and Profit Margins in Property-Liability Insurance: Theory and Empirical Results," *The Bell Journal of Economics* 10 (Spring 1979) pages 192-210, reprinted in J. David Cummins and Scott E. Harrington (eds.), *Fair Rate of Return in Property-Liability Insurance* (Boston: Kluwer*Nijhoff Publishing, 1987), pages 1-26, finds that insurance losses have a slight negative correlation with stock returns. Other writers find no significant correlation between underwriting returns and stock prices. Stock returns reflect economic conditions, so the implication is that loss costs have little relation to economic prosperity.

In general, the relationships' noted in the text are based on conjecture and intuition. This explanation of underwriting cycles fails for other reasons, and the absence of facts among adherents of this theory is simply an additional flaw.

[26] The Virginia Bureau of Insurance interprets underwriting cycles in this fashion. "The insurance cycle is usually out-of-phase with the rest of the economy. When prices for general goods and services are rising, insurance rates are often stable and insurance industry profits are decreasing. By the time that the rate of increase in the price for other goods and services diminishes, data is becoming available showing that insurance rates have not kept up with underlying costs. Insurance rates then increase rapidly and profits improve. This lag between price increases in the insurance industry and the rest of the economy is in large part due to the time required for claims to be reported and settled and for claims data to be collected and evaluated." See the report by the Virginia Bureau of Insurance, State Corporation Commission, *Competition in the Property and Casualty Insurance Industry: An Evaluation of Alternative Methods of Rate Regulation* (Richmond, Virginia: January 1978).

Awareness and Action:

There are factual problems with this interpretation. Are underwriting cycles truly counter-cyclical to macroeconomic conditions? (Generally not.) Are loss cost trends that different in prosperous times and recessionary times? (Not always.) But there are more fundamental reasons why this explanation fails - and these reasons help illuminate the true forces driving the cycle.

First, this interpretation presumes that pricing actuaries are unable to learn from past mistakes, incapable of forecasting loss cost trends despite years of experience. This is not true: actuaries are quite proficient at estimating insurance costs and are not easily deluded by random weather disturbances, social phenomena, or macro-economic conditions. In fact, both actuaries and insurers have been aware of true loss cost trends even as rates moved in the opposite direction. For example, insurers knew that General Liability loss costs were rising rapidly in the early 1980's, but they continued cutting rates well below marginal cost.

Indications and Prices:

Second, underwriting cycles are not due to actuarial rate indications. They are due to insurer reluctance to adopt actuarially recommended rate increases, to rate deviations below bureau rates, to schedule rating credits for commercial risks, and to similar "discretionary" rate reductions. Underwriting cycles are as manifest in the disparity between actuarially indicated rates and marketplace prices as in the reported net income of insurers.[27]

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[27] A more sophisticated connection of underwriting cycles with rate making techniques has been presented by Emilio C. Venezian, "Ratemaking Methods and Profit Cycles in Property and Liability Insurance," *Journal of Risk and Insurance,* Volume 52, Number 3 (September 1985) pages 477-500. The article's abstract provides the flavor of its thesis: *"Insurers and rating bureaus often use regression of past costs, or of loss ratios, on time as a way of estimating future rate requirements. A model of this process suggests that the rates set by such methods would create a quasi-cyclical pattern of underwriting profit margins. . . . Empirical data on major lines of property and liability insurance are consistent with the hypothesis that ratemaking methods contribute to the fluctuations of underwriting profit margins."*

Venezian does not ascribe underwriting cycles entirely to rate making methods. He suggests only that these methods contribute to the cycle. Unfortunately, all these "rate making" interpretations search for the cycle in actuarial indications, where it does not exist. They ignore competitive pricing strategies, where the cycle is powerful.

J. David Cummins and J. Francois Outreville, "An International Analysis of Underwriting Cycles in Property-Liability Insurance," *Journal of Risk and Insurance*, Volume 54, Number 2 (June 1987), pages 246-252, propose a model along the same lines, though with different causal variables. They ascribe underwriting cycles to (a) data collection lags, (b) regulatory lags, (c) policy renewal lags, and (d) calendar year financial reporting. As with Venezian's interpretation, this model fails to distinguish between rate making indications and actual pricing.

If disinterested analysts, uninvolved in the economic fortunes of particular insurers, were to generate "actuarially indicated rates" to which the entire industry adhered, we would experience no underwriting cycles. Rate making procedures have little or no influence on actual profit cycles. However, insurance premium rates are different from actuarial indications. Real-world prices are not the result of mathematical exercises, whether simple or sophisticated. And it is in the prices charged on the street that we may discern the workings of the cycle.

SECTION 4: INTERPRETATIONS OF THE CYCLE: UNDERWRITING PHILOSOPHY

A second prevalent interpretation of insurance underwriting cycles relies on the "mass psychology" of underwriters.[28] During profitable years, insurers grow optimistic and compete strenuously for new business. Since capacity is limited only by financial and psychological constraints, not by physical plant and equipment, supply expands. Demand is inelastic, so premium growth means attracting business from other insurers. Severe competition in a mature market requires insurers to lower prices to gain market share.

Profits soon decline, due to lower premium rates and the insuring of low quality risks. Underwriters become pessimistic, curtail their acceptance of marginal applicants, and file for rate increases. Profits remain low until insurers reunderwrite their business and the new rates take effect. Eventually, the rate increases and the more careful underwriting lead to increased profits, and the cycle starts anew.

Information and Coordination:

But should not the supply proffered and the quantity demanded converge on an equilibrium point, and the underwriting cycles cease? Stewart offers two reasons for the absence of such convergence:

> The cyclical process does not end for two reasons: lack of information and lack of coordination. Individual insurers do not and cannot know the precise amount of insurance to supply to reach equilibrium. They have different operating costs and, therefore, different break-even points or minimum acceptable margins of profit. Their perceptions and expectations of future profits or losses develop in different ways. In self-interest, they do not coordinate their actions. Collusion, furthermore, is illegal. Even when prior approval and rating bureaus had more

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[28] For a comprehensive exposition, see Barbara D. Stewart, "Profit Cycles in Property-Liability Insurance," in John D. Long and Everett D. Randall (eds.), *Issues in Insurance*, Volume 1, Third Edition (Malvern, PA: The American Institute for Property and Liability Underwriters, 1984), pp. 273-334.

This explanation is unusual, since the lack of strategic coordination and imperfect information should lead to *stable* equilibria. If firms can not coordinate prices and quantities, then the price mechanism effectively equates supply and demand. In fact, the competitive characteristics of the insurance industry that Stewart herself notes argue for a more stable equilibrium, since underwriters can quickly adjust supply to end any disparity with the quantity demanded.[30]

Uniform Psychology:

But the fundamental problem with this explanation is not the "lack of cooperation" or the "lack of coordination" theses but the reliance on a uniform psychology among underwriters. An individual underwriter may be more or less optimistic in different years. But how is it that ten thousand underwriters across the United States are optimistic and pessimistic in unison?

The enigma of underwriting cycles is not that any individual underwriter accepts risks in one year that he or she would reject in another. Rather, it is that profits for insurers move in concert. In contradistinction to Steward's explanation, this phenomenon indicates a higher level of competitive strategy than we would otherwise suspect. Insurers no less than other firms, are sensitive to the prices charged by their competitors, and they adjust their own rates accordingly.

Stewart's thesis shows the outlines of the cycle: the stable demand, the competition among insurers, the fluctuating prices, and the relatively uniform practices among underwriters at

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[29]   Stewart, 1984, *op. cit.*, page 293.

[30]   Stewart also cites a "cobweb" interpretation for the continuation of underwriting cycles: "Cycles that result from supply's responding to profit expectations are described in textbook economic theory by what is called a 'cobweb.' . . . In agriculture, as in property-liability insurance, demand is steady and supply is variable, with the result that prices tend to move with changes in supply" (page 293).

On the contrary: standard "cobweb" explanations rely on the *period to period lag* in revising supply. In agriculture, supply can not be adjusted rapidly, since it depends on the amount seeded in previous months, not just on the marketplace price. See, for instance, Mordechai Ezekiel, "The Cobweb Theorem," *Quarterly Journal of Economics* (February 1938), pages 255-280; reprinted in Haberler, Gottfried, (ed.), *Readings in Business Cycle Theory* (Philadelphia: The Blakiston Company, 1944), pages 422-442: "For a commodity where the production process occupies a definite interval of time, the period considered may be taken as so short that the total supply available cannot be changed within the period (as, for example, the supply of cotton or potatoes once the year's crop is harvested)" (page 426), and "The cobweb theory can apply exactly only to commodities which fulfill three conditions: . . . (2) where the time needed for production requires at least one full period before production can be changed. . ." (page 437). A six year cycle presumes a three year production lag (page 436).   This is not the case for insurance: supply depends only on price and can be quickly adjusted.

any given time. But the connections among these phenomena remain unexamined. To flesh out these relationships, we must ask: "What additional characteristics of the insurance marketplace relate to profit cycles?" and "How do these characteristics account for the fluctuations in underwriting income?"

SECTION 5: INTERPRETATIONS OF THE CYCLE: CASH FLOW UNDERWRITING

Insurers pay losses well after they collect premiums, particularly in the liability and Workers' Compensation lines of business. Policyholder supplied funds are invested in financial markets until losses are paid. Thus, insurance income may be divided into underwriting and investment portions. Underwriting income is the difference between (i) premium revenues and (ii) loss plus expense payments. Investment income is the net return on invested assets.

Interest Rates:

Interest rates rose rapidly in the late 1970's, reflecting the inflationary trends in the U.S. economy. Investment income became a larger portion of insurance earnings, and underwriting income decreased. Insurers wrote policies at expected underwriting losses, since they relied on investment returns for an overall profit.

Many insurers, accustomed to underwriting profits, viewed the reliance on investment returns as a lack of "underwriting discipline." They castigated this new philosophy as "cash flow underwriting": writing policies at a loss simply to generate premium dollars for investment.

Cash flow underwriting is appropriate as long as interest rates remain high. But by the mid-1980's, new money interest rates had fallen. The lack of underwriting discipline continued; insurers kept writing policies at underwriting losses. Investment income was no longer sufficient to compensate for these losses, so insurance operating returns declined. This was the underwriting cycle nadir of the mid-1980's.[31]

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[31] See, for instance, Robert T. McGee, "The Cycle in Property/Casualty Insurance," *Federal Reserve Bank of New York Quarterly Review*, Autumn 1986, pages 22-30: "Changes in interest rates are the primary force behind the recurrent swings in the industry's profitability" (page 22). To explain the intensity of the 1980's cycle in the Commercial Liability lines of insurance, McGee writes: "The combined ratio for long-duration lines of insurance should move more than the ratio for short-duration lines over the interest rate cycle, and the mix of insurance by lines will affect the timing and volatility of the property/casualty cycle" (page 25). He acknowledges that "workers' compensation lines are long-tailed, but their combined ratio does not behave as the increased interest-sensitivity principle would suggest," though he ascribes this anomaly to policyholder dividends and stringent rate regulation.

J. David Cummins and David J. Nye, "Inflation and Property-Liability Insurance," in John D.

This argument was popular several years ago. It has lost favor recently, since the underwriting cycle has lost no force despite the present stability of interest rates. Nevertheless, it is still useful to examine the problems with this interpretation.

Underwriting and Investment Income:

First, the distinction between underwriting and investment income is specious. Cash flows must be discounted to a common date to appropriately match revenues and expenses. True underwriting income, or insurance income, is the difference between (i) premium revenues and (ii) discounted loss plus expense payments.[32] True investment income is (i) the return on

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Long and Everett D. Randall (eds.) *Issues in Insurance*, Third Edition (Malvern, PA: American Institute for Property and Liability Underwriters, 1984), Volume I, page 222, similarly state: "Cash flow underwriting due to high investment income is the dominant factor in [the] 1983-84 [underwriting cycle trough]. . . . The underwriting losses also may be viewed as a cost of investable funds, analogous to a bank's payment of interest on savings accounts. Such losses would be justified if the net result, considering both underwriting and investment income, were generally satisfactory. This is generally accepted as being the reason for the extremely poor underwriting results of the early 1980's." This would be reasonable if investment income counterbalanced the underwriting losses. But total operating income of the industry was negative in 1984.

[32] Discounted cash flows are generally accepted as a measure of true income, though the appropriate discount rate for insurance losses is unclear. Stephen P. Lowe suggest a "negotiated rate" that is set by the senior management of the insurance company; see his "A New Performance Measure For P/C Insurers," *Emphasis*, Summer 1988, pages 8-11. Richard G. Woll recommends an after-tax "risk-free" rate, such as the Treasury Bill rate; see his "Insurance Profits: Keeping Score," in *Financial Analysis of Insurance Companies* (Casualty Actuarial Society 1987 Discussion Paper Program), pages 446-533. Robert P. Butsic derives a "risk adjusted" discount rate based upon historical insurance experience; see his "Determining the Proper Interest Rate for Loss Reserve Discounting: An Economic Approach," in *Evaluating Insurance Company Liabilities* (Casualty Actuarial Society 1988 Discussion Paper Program) pages 147-188. William H. Fairley, Raymond Hill, Stewart C. Myers, and Richard A. Cohn use risk adjusted discount rates, based on extensions of the Capital Assets Pricing Model to insurance losses. See William H. Fairley, "Investment Income and Profit Margins in Property-Liability Insurance: Theory and Empirical Results," *The Bell Journal of Economics and Management Science*, Vol10 (Spring 1979) pages 192-210, reprinted in J. David Cummins and Scott E. Harrington (eds.), *Fair Rate of Return in Property-Liability* Insurance (Boston: Kluwer * Nijhoff Publishing, 1987), pages 1-26, Raymond Hill, "Profit Regulation in Property-Liability Insurance," *The Bell Journal of Economics*, Vol 10, No. 1 (Spring 1979) pages 172-191, and Stewart C. Myers and Richard A. Cohn, "A Discounted Cash Flow Approach to Property-Liability Insurance Rate Regulation," in Cummins and Harrington (eds.), *Fair Rate of Return in Property-Liability, op. cit.*, pages 55-78. The 1986 Federal Income Tax amendments mandate the use of the federal midterm rate for discounting loss reserves; see Owen

invested surplus funds, (ii) the difference between actual and expected returns on policyholder supplied funds, and perhaps (iii) the difference between expected returns and the return assumed in the discount rate.[33]

When underwriting income, or insurance income, is properly measured, it is not necessarily reduced by a rise in interest rates. The higher interest rates indicate a larger discount rate and therefore smaller discounted losses. However, liability losses are inflation sensitive. Higher interest rates that are accompanied by accelerating inflation increase the nominal settlement values of insurance losses even as they raise the appropriate discount rate. A jump in inflation increases investment returns and also raises expected loss payments. It should have little effect on profitability.[34]

In other words, when inflation is modest, both the discount rate and expected losses are low. When inflation accelerates, both the discount rate and expected losses increase. It is unclear

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M. Gleeson and Gerald I. Lenrow, "An Analysis of the Impact of the Tax Reform Act on the Property/Casualty Industry," in *Financial Analysis of Insurance Companies* (Casualty Actuarial Society 1987 Discussion Paper Program), pages 119-190. Others have suggested embedded yields (similar to the Insurance Expense Exhibit approach) or new money market rates (which life actuaries use). The lack of agreement on the appropriate discount rate hampers consistency among insurance companies in analyzing income.

[33] For numerical examples and additional discussion, see Richard G. Woll "Insurance Profits: Keeping Score," *op. cit.*

[34] For the relationship of liability loss payments to market interest rates, see Robert P. Butsic, "The Effect of Inflation on Losses and Premiums for Property-Liability Insurers," in *Inflation Implications for Property-Casualty Insurance* (Casualty Actuarial Society 1981 Discussion Paper Program), page 51, and Sholom Feldblum, "Asset-Liability Matching for Property/Casualty Insurers," *Valuation Issues* (Casualty Actuarial Society 1989 Discussion Paper Program), pages 117-154.

Robert McGee, 1986, *op. cit.*, is aware of the inflation sensitivity of liability losses: "Inflation also has an impact on the relationship between the competitive price of insurance and interest rates. If costs of settling claims are expected to rise through time, a higher premium or investment return will be necessary to cover future costs. To the extent that rising interest rates reflect anticipated inflation, they should not affect insurance premiums" (page 23).

McGee hypothesizes that "uncertainty about the inflation outlook" in a competitive industry depresses market prices to those of the most optimistic insurer. Widely fluctuating interest rates lead to greater uncertainty and therefore a decline in insurer profitability. This explanation ignores McGee's own statement that as long as inflation and interest are correlated, different inflationary expectations should not affect insurance premiums.

which effect is stronger.[35]

Asset-liability matching theory also implies a different outcome than that suggested by "cash-flow underwriting" interpretations of the underwriting cycle. The average duration of Property-Liability insurers' assets is longer than that of their liabilities. A drop in interest rates, as occurred in the mid-1980's, causes an increase in profits, not a decrease in profits. In fact, those insurers that bought long-term bonds at high yields in the late 1970's and early 1980's enjoyed above average investment returns in the mid- and late-1980's.[36]

Financial Competence:

Finally, and most fundamentally, a "cash-flow underwriting" interpretation of underwriting cycles assumes a widespread incompetence among insurance company investment managers and underwriters. It presumes either that investment managers were surprised by the fall in interest rates in the mid-1980's or that underwriters are unable to adjust rates for changes in investment income. But no one was shocked by the fall in interest rates in the 1980's. On the contrary: financial analysts were surprised that interest rates stayed high even after inflation decreased. Similarly, good underwriters aim at long-term operating profits. They are not easily deceived by steady changes in investment returns.

Interpretations of the underwriting cycle abound. The majority presume that someone is erring: rate making methods are naive, underwriters are simplistic, regulation is rigid, or investment managers are deceived. Such explanations search for a cause where it is not to be found. Insurers are no less rational than other firms are. They exist in a highly competitive market, where the foolish firm does not long survive.

So we turn to microeconomic theory, and we examine the market structure of the insurance industry. We ask: "What are the implications for expected profits?" With this information, we develop a model of underwriting cycles based on *rational insurer strategies*.

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[35] The traditional view is that the effect on losses is stronger, so accelerating inflation hurts insurers. Robert Butsic, in a more rigorous examination of this question, concludes that the effect on the discount rate *may* be stronger, depending on the inflation sensitivity of the losses. See his "The Effect of Inflation on Losses and Premiums for Property-Liability Insurers," 1981, *op. cit.* Butsic's reasoning is persuasive, particularly with regard to long-term inflationary effects.

[36] For the effect of interest rate changes on the returns of mismatched portfolios, see G. O. Bierwag, George G. Kaufman, and Alden Toevs, "Duration: Its Development and Use in Bond Portfolio Management," *Financial Analysts Journal*, (July-August 1983), or F. M. Redington, "Review of the Principles of Life-Office Valuations," *Journal of the Institute of Actuaries*, Volume 18 (1952) page 286-340. For an analysis of asset and liability durations of insurance portfolios, see Sholom Feldblum, "Asset Liability Matching for Property/Casualty Insurers," in *Valuation Issues* (Casualty Actuarial Society 1989 Discussion Paper Program), pages 117-154.

SECTION 6: COMPETITION AND PROFITS

For the moment, we step aside from insurance and delve into economics and business theory. We ask: "What is the relationship between competition and profits?"

We consider first the economist's perspective, examining competitive, monopolistic, and oligopolistic market structures. We then analyze the insurance industry from a concrete business viewpoint, examining policy differentiation, policyholder loyalty, and the ease of entry into the insurance marketplace. We seek to determine: "Given the structural characteristics of the insurance industry, what price-cost margin should we expect?"

Textbook Models: Competition and Monopoly

Undergraduate economics textbooks present two market models: pure competition and single firm monopolies. These models are meant only to illustrate the forces that determine prices, not to depict actual practice.

In *pure competition*, prices are determined by industry-wide supply and demand. No individual firm can unilaterally affect market prices. If a firm restricts supply, its competitors take up the slack. If a firm raises prices, consumers purchase the product elsewhere.

In a *monopolistic* industry, a single firm dominates the market. Entry of competing firms is sufficiently restricted that the monopolist can adjust the quantities supplied and the prices charged to maximize its profits.

Competition:

What market price results from each model? Suppose that the price in a competitive industry exceeds the marginal cost of producing the product. Any firm could cut prices slightly, garner a greater market share, and increase its profits.

Similarly, if the market price were below marginal cost, firms would soon leave the industry and employ their capital elsewhere. Equilibrium is achieved only when price equals marginal cost.

Equilibrium is a central concept for our analysis. Equilibrium means that there is no tendency for prices to either rise or fall.[37] Economists maintain that equilibria generally obtain in free

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[37] Industrial economists, when considering firm behavior, often speak of Nash equilibria. A *Nash equilibrium* obtains when no firm has an incentive to modify its production or price strategy. If firms seek to maximize their income, this implies that no firm can obtain

markets.   Underwriting cycles, however, seem a stark example of disequilibrium: prices
continually fluctuate.

Monopoly:

Under suitable conditions, the monopolist will not price its product at marginal cost if it seeks
to optimize its income.[38]   When price equals marginal cost, there are no economic profits for

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greater profits by raising or lowering its price or by increasing or decreasing the quantity that
it supplies.   Michael Waterson, *Economic Theory of the Industry* (Cambridge: Cambridge
University Press, 1984), page 41, using a game-theoretic approach to industrial economics,
defines a *Nash non-cooperative equilibrium* as the "point such that each player's strategy
maximizes his expected payoff if the strategies of the others are held fixed."   James Friedman,
Oligopoly Theory (Cambridge: Cambridge University Press, 1983), page 49, uses a similar
definition: "A [Nash] noncooperative equilibrium consists of *n* particular strategies, one for
each firm, so chosen that no single firm could possibly have obtained higher profits if it, alone,
had selected a different strategy."   Drew Fudenberg and Jean Tirole review the formal theory of
Nash equilibria in "Noncooperative Game Theory for Industrial Organization: An Introduction
and Overview," in D. Schmalensee and R. Willig (eds.), *Handbook of Industrial Organization*
(forthcoming).   The concept was introduced by John F. Nash, Jr., in "Noncooperative Games,"
Annals of Mathematics, Volume 45 (1951), pages 286-295.

When market conditions cause firms to have different strategies - some seek stable current
income and others seek to increase sales - Nash equilibria often dissolve.   This phenomenon
underlies the model of underwriting cycles developed below.

[38] These conditions are that either *the marginal cost rises as quantity supplied increases*
or that *the demand curve slopes downward.   Marginal cost* is the cost of producing an additional
unit of the good.   In insurance, this is the expenses and anticipated losses of writing an additional
policy, not the average expenses and losses incurred on the current book of business.   The
demand curve is the relationship between consumer demand and the product's price.   In
insurance, this is the number and size of policies and endorsements desired by consumers at
each premium rate.

Both conditions are satisfied in the insurance market.   (1) The *demand curve* in many lines of
business is nearly vertical, because of statutes, regulations, and business policies that mandate
coverage.   See William A. Sherdan, "An Analysis of the Determinants of Demand for Automobile
Insurance," *The Journal of Risk and Insurance*, Volume 51, No. 1 (March 1984), pages 49-62,
and Sholom Feldblum, "Persistency and Profits," in the *Casualty Actuarial Society 1990
Discussion Paper Program.*   (2) The *marginal cost* curve rises sharply, despite the
preponderance of variable costs in insurance.   As Stephen P. D'Arcy and Neil A. Doherty note in
The Financial Theory of Pricing Property-Liability Insurance Contracts (Homewood, IL:
Richard D. Irwin, Inc., 1988), p. 9: ". . . an insurer writing a large quantity of policies will

the firm. But if the monopolist restricts output, consumers "bid up" the price to obtain the scarce good. Price exceeds marginal cost, and the firm receives additional profits.

At equilibrium, the market price equals marginal revenue. (Marginal revenue is the extra income earned by selling an additional item. This should be distinguished from the average revenue obtained on the current policy portfolio.) In a purely competitive marketplace, price equals marginal revenue which equals marginal cost. In a monopolistic market, marginal revenue generally exceeds marginal cost. In other words, prices are higher in a monopolistic market than they would be in a competitive market.[39]

Actual Market Structures:

These market structures rarely exist in their ideal forms. Even when there are thousands of firms selling similar products, competition is seldom perfect. For instance, grocery stores exist all over, selling the same foods: is this not pure competition? But most individuals use the nearest corner grocery for small purchases, and do not bother to price shop. In other words, the grocery store may have a near monopoly within a small neighborhood.[40]

Monopolies are equally hard to maintain. IBM dominated the market for mainframe business computers in the 1960's, and it enjoyed large price-cost margins during those years. But competitors soon entered wherever profits beckoned - computer peripherals, software

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eventually have to relax underwriting standards to increase the quantity further, and the newer policies could have a higher expected loss ratio." That is, at low quantities, insurers can "skim the cream," selecting the best risks. At higher quantities, insurers offer coverage even to mediocre and poor risks. Thus, marginal costs rise as the number of policies issued increases.

[39] Economics textbooks describe these models in depth. See, for instance, Paul A. Samuelson and W. D. Nordhaus, *Economics*, 12th edition (Manchester, MO: McGraw Hill Book Company, 1980); Edwin Mansfield, *Microeconomics: Theory and Applications*, Second Edition (New York: W. W. Norton & Company, Inc., 1975), chapters 8 and 9; Hal R. Varian, *Intermediate Microeconomics: A Modern Approach* (New York: W. W. Norton and Company, 1987), chapter 25; or Evan J. Douglas, *Intermediate Microeconomic Analysis: Theory and Applications* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1982) chapters 9 and 10.

[40] Economists speak of spatial differentiation among suppliers. See, for example, Frederick M. Scherer, *Industrial Market Structure and Economic Performance*, Second Edition (Boston: Houghton Mifflin Company, 1980), page 325: "Even when firms produce physically identical commodities, complete homogeneity is not likely to be attained because of differences in location. . . . When producers are located at different points on the map, their products are said to be *spatially differentiated*."

programs - and they quickly gained significant market shares.[41]

Nevertheless, these two models are important, for they set the bounds of the price range. If capital can be transferred to other uses, firms will not price below marginal cost.[42] And if supply is adequate, firms will not price above the monopoly price.

This price range is wide, since the monopoly price may be well above marginal cost. So if the market is neither purely competitive nor monopolistic, what prices will actually be charged?

Economic Models:

Economics is rigorous. Theorists provide the needed assumptions, then "prove" the desired conclusions. But these assumptions are invariably idealistic. The equations are mathematically perfect but of limited practical value.

We can not proceed without a theoretical framework. We will deal with price-cost margins, Nash equilibria, entry conditions, and price elasticity of demand. However, we are interested not in formulating theorems but in understanding a business phenomenon: the underwriting

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[41] On the history of IBM's market dominance in the mainframe computer industry and the entry of competitors in peripheral equipment and software products, see Gerald W. Brock, "The Computer Industry," in Walter Adams (ed.), *The Structure of American Industry* (New York: MacMillan Publishing Company, 1986), pages 239-260.

Government sponsored monopolies, such as municipal utilities, cable TV franchises, and telephone service until the 1980's, are different. These industries have strictly regulated rates; they do not price by supply and demand considerations.

The diversity of insurance rate regulation affords a range of insurance markets. In some states, such as Massachusetts and Texas, insurance rates are set by the regulator or by official rating bureaus. In other states, such as Illinois and pre-1989 California, the free market determines insurance prices. Insurance rate regulation is a factor (albeit a minor one) in underwriting cycle severity, and is discussed in more detail in Section 11.

[42] Transferring capital can be difficult, and firms may price below marginal cost in a *declining* industry. The personal insurance lines present an excellent illustration of this. Over the past 40 years, direct writers have steadily garnered most of the Personal Lines market, and they have consistently attracted the better risks among the insured population. Independent agency companies have *a declining market with worsening risk quality.* Many of these companies are slowly moving to other lines of business (such as Commercial, Specialty, Reinsurance, and substandard auto), experimenting with less expensive distribution systems (such as direct mail), or trying to start joint ventures with other financial institutions (such as life insurers, health insurers, and securities brokers). Meanwhile, average Personal Lines returns for independent agency companies are below marginal cost.

cycle. So we must step gingerly over the coming terrain.

We can view this distinction from another perspective. Economic models abstract reality. They isolate some elements, and the results are determined from the assumptions. The business world is represented by succinct mathematical expressions.

Underwriting cycles, however, are complex phenomena, and no two companies react identically to their course. We will not try to determine the exact duration or severity of the cycles. Rather, we seek to understand the driving forces behind insurance pricing.

We begin, therefore, with an abstract model, of pricing in a competitive market with a limited number of firms.[43] Our emphasis will be on Nash equilibria and conjectural variation. We then revise the model, discarding the idealism and adding reality. Finally, we construct an insurance model, based on the characteristics of the Property/Casualty industry, to explain underwriting cycles.

Conjectural Variation:

Suppose two rival firms, producing identical products, each have 50% of the market. Consumers are conscientious price shoppers with excellent information, so if either firm underprices the other it will quickly capture the entire market. If the firms compete by setting prices, then a static microeconomic analysis implies that both firms will set prices at marginal

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[43] In truth, there are thousands of American insurers, and dozens of new ones enter the industry each year. This is a central characteristic of the insurance model that we develop further on. For clarity of exposition, however, we begin with a model of a limited number of firms.

Supplier interdependence is enhanced by high market concentration. Some economists use four firm concentration ratios of 50% or greater, or a Herfindahl-Hirshman index of about 1,000 or greater, as indicators of possible interdependence. (See, for example, the Justice Department merger guidelines for antitrust action.) The Personal Auto insurance industry shows a four firm concentration ratio of 40% and a Herfindahl-Hirshman index of 610 on a national basis, and corresponding average figures of 53% and 1,000 on a statewide basis. These figures depend on the definition of the market: state versus national and individual line versus all insurance products. Inter-industry comparisons of market concentration must use similar criteria of market definition; if so, insurance shows low relative concentration. See Robert Klein, "Competition in Private Passenger Automobile Insurance," (A Report to the NAIC Personal Lines (C) Committee, September 1989), Table 1 (page 12) and Table 4 (pages 18-19) for more detail.

cost.[44] For if one firm prices above marginal cost, the other firm can charge slightly less, gain the other 50% of the market, and increase its total profits.

This analysis is static: it considers only a single time period. Dynamic models presume that firms respond to their rivals' competitive actions. Moreover, each firm anticipates how its rivals will respond *before* implementing its own strategy. Economists term this "conjectural variation": that is, "Each firm believes that its choice of price will affect the price selected by

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[44] Firms may compete either by setting *prices* or by choosing the *quantities* they supply. Price and quantity are interrelated, since the industry demand curve sets a one-to-one relationship between them. If firms compete by choosing the quantities they supply, "Cournot competition" implies that the resulting price will exceed marginal cost. The price-cost margin varies inversely with the number of firms: one firm (pure monopoly) produces the greatest profits, and an infinite number of firms (pure competition) eliminates economic profits. See Jean Tirole, *The Theory of Industrial Organization* (Cambridge, MA: The MIT Press, 1988), pages 218-221, or Frederick M. Scherer, *Industrial Market Structure and Economic Performance*, Second Edition (Boston: Houghton Mifflin Company, 1980), pages 152-155. Cournot's original work was published in 1838 as *Recherches sur les Principes Mathematiques de la Theorie des Richesses*; English translation, edited by N. Bacon: *Researches into the Mathematical Principles of the Theory of Wealth* (New York: Macmillan, 1897).

Manufacturing firms with long production cycles may compete by choosing the quantities that they supply. A Cournot analysis is appropriate for them. Insurers have almost no supply restrictions; rather, they compete on premium rates. A "Bertrand" analysis, which results in price equaling marginal cost, is the appropriate model (see below in this note). See Tirole, 1988, *op. cit.*, pages 209-212, or Hal R. Varian, 1987, *op. cit.*, pages 461-464. Bertrand's original article was published in 1883 as "Theorie Mathematique de la Richesse Sociale," *Journal des Savants*, pages 499-508.

The appropriate model for insurers depends on their supply constraints. Unlimited capacity implies that firms compete by setting prices. Severe capacity constraints imply that firms compete by choosing quantities. For an analysis of the limits on insurance capacity, see James M. Stone, "A Theory of Capacity and the Insurance of Catastrophe Risks," *The Journal of Risk and Insurance*, Part I in Volume XL, Number 2 (June 1973), pages 231-243, and Part II in Volume XL, Number 3 (September 1973), pages 339-355. Stone's analysis applies to large Commercial risks, where random losses may adversely affect an insurer's income or even solvency. In practice, there are no capacity constraints in the Personal Lines and in small Commercial risks. Moreover, for some large risks, the availability of reinsurance mitigates the capacity constraints.

For a general discussion of insurance supply, see Barbara D. Stewart, 1984, *op. cit.*, pages 273-334. Steward correctly notes that insurance supply is determined by psychological and financial considerations, not by plant, equipment, labor, or other physical restrictions. The ability of insurers to quickly revise quantities and prices is an essential aspect of the underwriting cycle; see Section 9 below.

its rivals."[45]

Suppose again that two firms producing identical products and competing on price each have 50% of the market. In the static analysis, if the market price exceeds marginal cost, then either firm may slightly reduce its price and garner the entire market. In reality, the businessman wonders: "If I cut my price to increase market share, how will my rival respond?"

Clearly, the rival will match the price cut - at least if a small reduction in price enables it to retain its market share. If both firms presume that the other will match a price cut, neither will initiate the price reduction.[46]

We formulate this mathematically as follows: Let P^m be the current *market* price, and P^c be the *competitive*, or marginal cost, price. Let "v" be a discount rate for future earnings (the discount rate is treated more fully below). Suppose that each firm knows that if it reduces its price below P^m, its rival will immediately and continuously charge P^c. Finally, assume that a price cut below the current market price promptly attracts the entire consumer population.[47]

The current market price, P^m, provides total industry earnings of E^m, a positive amount. The marginal cost price, P^c, provides zero economic profits; that is, $E^c = 0$. If both firms maintain the current market price, P^m, their earnings will be $(E^m + vE^m + v^2E^m + \ldots)/2$ for each. If either firm slightly shades prices, its earnings will be E^m in the current period.[48] Since its rival quickly cuts prices to marginal cost, its earnings are 0 in all future periods.

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[45] Tirole, *op. cit.*, page 244. For a mathematical development, see Hal R. Varian, *Microeconomic Analysis*, Second Edition (New York: W. W. Norton and Company, 1984), pages 102-103, or Michael Waterson, *Economic Theory of the Industry* (Cambridge, Cambridge University Press, 1984), pages 18-19. See also Michael Porter, *Competitive Strategy* (New York: The Free Press, 1980), *passim*, for a non-mathematical discussion of the strategic consideration of expected rival responses.

[46] That is, conjectural variation influences optimal business strategy. If an insurer believed that its peer companies use cost-based pricing and that they do not consider competitive pressures, it would have no disincentive to reduce rates in order to gain market share. In practice, insurers' prices are strongly affected by those of their rivals. This is most evident in the Personal Automobile market, where the major direct writers carefully examine their rivals' rates, by territory and classification, to set their own prices.

[47] These are the ideal assumptions so endearing to economists. We will return to reality in a few paragraphs.

[48] This is a theoretical model. It assumes that an infinitesimal price reduction attracts the entire market. In insurance, (1) a substantial rate reduction is required to gain market share, and (2) shifts in the insured population occur at renewal time, not continuously. The model of underwriting cycles developed below incorporates these realistic elements.

If the firms are to be dissuaded from cutting prices, then E^m must be less than $(E^m + vE^m + v^2E^m + \ldots)/2$. That is,

$$1 < (1 + v + v^2 + \ldots)/2, \text{ or } v > 1/2.$$

This makes sense. If "v" is high enough (more than one half in this instance), firms are unwilling to sacrifice future earnings for immediate profits. Conversely, if "v" is low, firms disregard future earnings and emphasize short-term results.[49]

Discount Rates:

The discount rate measures the relative value of a dollar of future earnings compared with a dollar of present earnings. The interest rate is a part - but only a small part - of this. The major part is the *uncertainty about future market and economic conditions.* Perhaps consumer demand will slacken, other suppliers will enter the industry, restrictive regulations will impede price adjustments - and future profits will dissipate. Perhaps demand will grow and entry barriers will harden, increasing future profits. Perhaps rival firms will differentiate their products and segment the market.[50]

Future earnings in an inflationary economy are worth less in real dollars. In a *competitive market*, they are also uncertain: anticipated profits may never materialize. Business strategy, which is a determinant of quantities supplied and prices charged, influences the realization and the magnitude of future profits.

The size of the discount rate ("v") needed to discourage price cutting varies with the number of competing firms. If there are two firms, "v" must be greater than 1/2, as the equation above implies. If there are ten rival firms, "v" must be greater than 9/10 to discourage price cutting.[51] The insurance market has hundreds of rival firms in the major lines of business, so this simple model implies that the discount rate must be near unity to discourage price cutting.

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[49] For more complete discussions, see Jean Tirole, 1988, *op. cit.*, pages 245-251, or Carl Shapiro's chapter in Richard Schmalensee and Robert D. Willig (eds.), *Handbook on Industrial Organization* (forthcoming).

[50] Describing the discount rate, δ, Carl Shapiro, *op. cit.*, notes: "Formally, δ may be thought of as the product of two terms: $\delta = \mu e^{-iT}$, where μ is the hazard rate for the competition continuing (*i.e.*, the probability that the game continues after a given period, given that it has not previously ended), and e^{-iT} is the pure interest component of the discount factor, with period length T and interest rate i.

[51] That is, E^m must be less than $(E^m + vE^m + v^2E^m + \ldots)/10$. Thus, $1 < (1 + v + v^2 + \ldots)/10$, or $v > 9/10$.

But before presenting a more sophisticated model to answer this problem, we must take another detour. How might a firm (or group of firms) choose an "optimal" price?

Limit Pricing and Entry Barriers:

The optimal price depends upon the strength of entry barriers. If entry barriers are sufficiently low, new firms may enter the market. Entrants can not gain market share if they charge the current price, so they have nothing to lose by price cutting.[52] Incumbent firms rarely let the market price remain high enough to attract new entrants.

The cut-off price between attracting and discouraging new entrants is termed the "limit price." But why should the limit price be any different from the competitive marginal cost price? If all firms have the same production costs, then any price exceeding marginal cost attracts new entrants.

But firms do not all have the same production costs. In particular, new firms face a fixed (sunk) cost of entry, so the limit price exceeds the marginal cost price.[53]

In theory, there are few barriers to entry in insurance. The insurer need build no factories to manufacture its product; it may contract for the needed actuarial, underwriting, and loss adjustment skills; and statutory capitalization requirements are relatively low. The firm may simply "hang out a shingle" and begin writing policies.

In practice, this is not correct. In the Personal Lines market, the direct writers are profitable whereas the independent agency companies are losing money. Yet few independent agency companies have successfully switched to direct writing or exclusive agency distribution systems. In other words, the constraints on the distribution system are powerful, raising large entry barriers to the *profitable* insurance markets.

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[52] In underwriting parlance, we speak of new entrants "buying" market share. A new firm may suffer operating losses for several years before it develops a profitable book of business. This is particularly true in insurance, since new entrants attract the marginal and unprofitable risks.

[53] On limit pricing, see Tirole, 1988, *op. cit.*, pages 367-374; and Paul Milgrom and John Roberts, "Limit Pricing and Entry Under Incomplete Information: An Equilibrium Analysis," *Econometrica*, Volume 50 (1982), pages 443-460.

Insurers face few fixed costs, particularly in lines of business dominated by the independent agency distribution system. Entry into the Commercial Lines insurance marketplace is deceptively easy - new firms believe they can enter quickly. Thus, there is a short span between the marginal cost price and the limit price.

Two major life insurance companies, Prudential and Metropolitan Life, entered the Property/Casualty Personal Lines market in recent years. Both companies had strong underwriting, actuarial, and distribution systems, enormous capital, and extensive experience in life and health insurance. Yet neither company has yet been able to transform its newly acquired Personal Lines risks into a profitable book of business. These hidden barriers to entry are strong deterrents to prospective insurers.

In other words, the traditional barriers to entry, such as minimum efficient production scales, or the advertising budget needed to place products on retail shelves, are not important in insurance. The insurance "distribution" barrier to entry does not involve getting consumers to purchase policies. Rather, it involves getting *good risks* to purchase policies.

We return to this topic later on, in our model of underwriting cycles. Note, however, how deceptive these barriers to entry are. It is easy to enter the insurance market, since there are *no major capital or regulatory barriers. It is far more difficult to enter successfully.*

These are the bounds postulated by industrial economics. In the long run, prices will not remain below marginal cost or above the limit price.[54] The actual prices charged depend on the number of firms, the extent of "conjectural variation," the discount rate assumed by each firm, and other factors affecting the price-cost margin.

The theoretical economist would ascribe the insurance industry's low profitability to the competitive characteristics of its market.[55] But we need a more specific analysis to understand underwriting cycles, so we ask: "How do the nature of the insurance product and the operations of the insurance carrier affect anticipated profits?"

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[54] In the short run, this is not true. In declining industries, prices often sink below marginal cost. In expanding industries, incumbent firms may price above the limit price, allowing new entrants even as they reap large profits. Numerous other short term exceptions are discussed in the economics literature.

[55] Irving H. Plotkin's studies have extensively documented the relative profitability of insurers and other firms. See particularly his *Studies on the Profitability, Industrial Structure, Finance, and Solvency of the Property and Liability Insurance Industry* (Cambridge, MA: 1970), "Rates of Return in the Property-Liability Insurance Industry: A Comparative Analysis," *Journal of Risk and Insurance*, Volume 36, No. 3 (June 1969), pages 173-200, and "Total Rate of Return and the Regulation of Insurance Profits," in *Total Return Due a Property/Casualty Insurance Company* (Casualty Actuarial Society 1979 Discussion Paper Program), pages 206-245.

SECTION 7: INSURANCE INDUSTRY CHARACTERISTICS

An industry's structure and the characteristics of its products influence both expected profits and strategic possibilities. Three considerations germane to insurance are

1. Product differentiation and substitute products,
2. Cost structures and barriers to entry, and
3. Consumer loyalty and price shopping.

These factors influence expected insurance profits, and they set constraints on business strategies. So we turn to these insurance attributes, in preparation for the model of underwriting cycles presented below.

Product Differentiation:

When firms supply products with varying attributes, such as automobiles, computer hardware, and fashion clothing, each of them may enjoy some market power and associated economic profits. When the products of competing firms do not vary much, as is true in agriculture, all firms may be constrained by the prices of the most efficient producer. In short, *product differentiation increases expected profits.*

Most insurance policies are indistinguishable to the average consumer. In certain lines of business, such as Workers' Compensation and no-fault Auto Insurance, benefits are mandated by statute. Even where no laws impede differentiation, product diversity is hard to maintain. Improved policy forms can be copied by rivals, so advantageous innovations are transient.

The existence of close substitutes for an industry's products has a similar effect: *substitutability constrains profitability.* For instance, aluminum often can be substituted for steel. Aluminum prices constrain steel profitability, regardless of competition in the steel industry.

In many lines of business, there are few substitutes for insurance. The Personal Lines consumer has no choice but to purchase an Auto Insurance or Homeowners' policy. Similarly, most business owners must buy Workers' Compensation insurance, since self insurance techniques are feasible mostly for large and sophisticated companies. The rising claims consciousness of the public, and the increasing predilection of Americans to turn to the courts, strengthens the demand for Commercial Liability products. Small businesses have no alternative other than to buy insurance protection.

In sum, *the lack of product differentiation means that individual insurers have difficulty increasing prices and profits. But the lack of close substitutes for an essential product means*

that the industry as a whole can raise or lower premium rates without losing consumer demand.[56]

Cost Structures and Barriers to Entry:

We distinguished above between traditional and "hidden" barriers to entry. Traditional barriers depend on cost structures: minimum efficient plant size, up-front capital requirements, the time needed to enter, and production process learning curves. Potential entrants observe these costs, which influence their willingness to join the industry.

Insurance has few traditional barriers to entry. Almost all costs, whether losses, loss adjustment expenses, commissions, salaries, and premium taxes, are variable, not fixed.[57] No plant need be built, no expensive equipment is required, and statutory capitalization requirements are low.[58] Moreover, most costs are paid either on the policy effective date (e.g., commissions) or after the policy is in force (e.g., losses).[59] The cash flows from "producing"

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[56] Formally, aggregate consumer demand for insurance products is inelastic with respect to price.

[57] The distinction between variable and fixed costs differs from the actuarial distinction between costs that vary directly with premium and those that do not. Salaries of non-managerial personnel do not vary directly with premium, but they are variable costs for most types of employment. The other expenditures listed in the text are both variable costs and vary directly with premium. See Sholom Feldblum, "Expense Allocation and Policyholder Persistency," *Casualty Actuarial Society 1990 Discussion Paper Program.*

[58] Allen L. Meyerson, "Ensuring the Solvency of Property and Liability Insurance Companies," in Spencer L. Kimball and Herbert S. Denenberg (eds.), *Insurance, Government, and Social Policy* (Homewood, IL: Richard D. Irwin, Inc., 1969), pages 146-190, notes that "the initial capital and surplus requirements of most states are much too low under present condition." Patricia Munch Danzon, "Rating Bureaus in U.S. Property Liability Insurance Markets: Anti or Pro-competitive?" *The Geneva Papers on Risk and Insurance*, Vol 8, No. 29 (October 1983), pages 371-402, examines the relationship of state licensing statutes to entry barriers, in terms of both delay of operations and cost of entry. She finds average delays of 6 to 10 months, and an average personnel cost per state for entry expenses of $100,000. She correctly notes that these costs are too small to serve as entry barriers.

[59] Other acquisition expenses and certain administrative and underwriting costs are expended before premiums are received. The National Council on Compensation Insurance, using a 1977 study of Massachusetts Workers' Compensation expenses, estimates that only 14% of "other expenses" (i.e., general expenses, other acquisition costs, and miscellaneous taxes, licenses, and fees) are paid before the policy's inception. See the NCCI Actuarial Operations

an insurance policy are positive, thereby facilitating the entry of new firms. Underwriting intricacies are not readily discernable, and many entrants *believe* that there is no significant learning curve. Finally, a firm can contract for underwriting, actuarial, accounting, and loss adjustment skills, so little time is needed before writing policies.

As we noted earlier, the "hidden" barriers to entry in insurance are powerful. It is easy to enter the insurance marketplace; it is far more difficult to enter successfully. New entrants attract marginal risks, and actual insurance losses are high in early policy periods. It takes many years to obtain a profitable book of business.[60]

So new firms continuously enter the insurance market. Were earnings steady, the high rate of entry would depress expected profits. But fluctuating earnings, and the "hidden" entry barriers discussed above, impair the chances of successful operations. Many new entrants, with low quality books of business, do not last through the trough of the first underwriting cycle.[61]

Consumer Loyalty:

Price changes affect purchasing decisions. If the price for a particular brand of toothpaste rises 10%, many buyers of that toothpaste may switch to other brands.

Some goods have large "switching costs." Consumers of large electrical equipment may not change suppliers unless prices rise substantially, since such a switch would involve costs of installation, inspection, testing, retraining, and adapting other machinery. In other words, consumer loyalty to a particular brand or supplier depends upon the costs of changing products.[62] High switching costs impede competition and raise expected profits.

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memorandum AC-38 (January 26, 1989), Exhibit 27-1, page 12. Howard C. Mahler, "An Introduction to Underwriting Profit Models," *Proceedings of the Casualty Actuarial Society*, Volume 71 (1987), pages 239-277, estimates that only 20% of "company expenses" (that is, general expenses, other acquisition expenses, and one half of unallocated claim expenses) are paid prior to the policy's inception. See pages 269-270 of his "Appendix II."

[60] See Conning & Co., *New Business versus Renewals: The Cost of New Business in a Soft Market* (Hartford, CN: Conning & Co., June 1988), and Sholom Feldblum, "Persistency and Profits," *Casualty Actuarial Society 1990 Discussion Paper Program.*

[61] See Section 9 below.

[62] See Michael Porter, *Competitive Strategy* (New York: The Free Press, 1980). Porter defines switching costs as "one-time costs facing the buyer of switching from one supplier's product to another's" (p. 10), and he adds: "Switching costs may include employee retraining costs, cost of new ancillary equipment, cost and time in testing or qualifying a new source, need

Toothpaste, unlike large electrical equipment, has no "switching costs." Consumers have no constraints, either *ante hoc* or *post hoc*, on the brands they choose. When switching costs are absent, competition more easily dissipates economic profits.

Insurance seems similar. At renewal time, a consumer can purchase coverage from a competing carrier with no additional costs or gaps in coverage. This implies low expected profits in insurance.

In truth, insurance is not at all like toothpaste, particularly in the Personal Lines. Insureds rarely compare competitors' prices when their policies come up for renewal, whether or not they made such comparisons when they first obtained the coverage.[63] Only if an insurer dramatically raises its rates will policyholders begin searching out other agents or carriers.

Over the long term, insurance is no different from other goods. Higher than average prices cause a slow but steady loss of market share, which is extremely difficult to win back. But in the short term, a reputable insurer can maintain a higher than average price-cost margin without a significant loss of business.

Were insurance earnings steady, *long-term* expected profits would be low. The lack of product differentiation and the apparent ease of entry would force insurers to price close to marginal cost.[64] But the lack of close substitutes, consumer loyalty, and the difficulty of successful entry facilitate *short-term* price fluctuations. These characteristics of the insurance industry underlie the model of underwriting cycles in the following sections.[65]

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for technical help as a result of reliance on seller engineering aid, product redesign, or even psychic costs of severing a relationship."

[63] For instance, Eugene H. Fox, "Automobile Insurance Analysis: The Twenty-Five and Under Age Driver vs. the Twenty-Six and Over Age Driver," *CPCU Journal*, Volume 33, No. 1 (March 1980), pages 22-25, reports that most of the auto policyholders who made cost comparisons did so at least two years prior to the survey date. See particularly his Tables 2 and 3 on page 23.

[64] Thus, the depressed historical returns of the insurance industry noted by Plotkin and others should be expected. See Section 6 above.

[65] We have assumed pricing freedom for insurance companies. But many states strictly regulate insurance rates, with firm prohibitions against excessive prices. Should not such regulation hinder business strategies that lead to fluctuating profits?

This question is not related to the strategic model of this paper. It is an empirical problem: if the states carefully regulate insurance prices, why do profits fluctuate so widely?

One common answer is that rates are adequate during profitable periods. During the troughs of the cycle, competitive price cutting either eliminates or severely reduces operating profits. Regulation sets the adequate rate level, but it can not prevent individual price reductions.

Were this true, the low *long-term* average profits would cause investors to withdraw their capital from the Property/Casualty insurance industry. This has not happened: average profits seem satisfactory to investors (though not enticing). If long-term profitability is reasonable, and profits are depressed during the troughs of the cycle, then profits must be more than adequate during good years. How is this possible, given the sophistication of actuarial pricing and the strictness of state regulation?

The underwriting cycle of the early 1980's was most evident in General Liability rates. The following summary of bureau rate making procedures for this line dissolves the dilemma presented in the previous paragraph.

The Insurance Services Office sets premium equal to anticipated losses, expenses, and profit. The "conservatism" in each of these elements allows a price above marginal cost:

(A) **Losses:** ISO uses nominal loss payments, not the present value of future loss payments. Richard Woll notes that General Liability losses are paid on average four to five years after the accident date; see his "Insurance Profits: Keeping Score," *Financial Analysis of Insurance Companies*, (Casualty Actuarial Society 1987 Discussion Paper Program), pages 446-533. At an 8% discount rate, General Liability nominal loss values are about 40% above their present values at the inception of the policy. More sophisticated pricing models discount premiums, losses, and expenses to the same date. See, for example, Richard G. Woll, "Insurance Profits: Keeping Score," *op. cit.*; Stewart Myers and Richard Cohn, "A Discounted Cash Flow Approach to Property-Liability Insurance Rate Regulation," in J. David Cummins and Scott E. Harrington (eds.), *Fair Rate of Return in Property-Liability Insurance* (Boston: Kluwer*Nijhoff Publishing, 1987), pages 55-78; Robert P. Butsic, "Risk and Return for Property-Casualty Insurers," in *Total Return Due a Property/Casualty Insurance Company* (1980 Casualty Actuarial Society Discussion Paper Program), pages 52-83; or Howard C. Mahler, "An Introduction to Underwriting Profit Models," *Proceedings of the Casualty Actuarial Society*, Volume 71 (1987), pages 239-277.

(B) **Expenses:** Rating bureaus often use expense provisions sufficient for most insurers, not just for efficient ones. The traditional justification has been that rating bureau rates should be adequate for all member companies. (This consideration will no longer be relevant when ISO changes to loss cost compilation.)

Interestingly, Longley-Cook has argued that even rating bureau *pure premiums* should be adequate for the less efficient or profitable insurers. In the 1950's, stock companies had fire insurance loss ratios about 10 points above those of mutual companies. Longley-Cook opines: "It would seem logical, therefore, for the fire rating bureau to promulgate rates at a level which provides the correct profit margin for the stock member companies and for mutual companies to use these rates or such lower rates as they may wish, by deviations or independent filings." See Lawrence H. Longley-Cook, Underwriting Profit in Fire Bureau Rates," *Proceedings of the Casualty Actuarial Society*, Volume 52 (1966), pages 305-311; discussion by Stanley C.

SECTION 8: MODELS AND REALITY

Economic models are abstractions of reality, discarding the obscuring details and uncovering the fundamentals of industrial behavior. Too often, however, rival firms are also "abstracted" into rational, omniscient, and unerring players in a stylized game.

We do not wish to add to abstract theory. On the contrary, we seek to understand underwriting cycles, a real world phenomenon in which rival firms are often irrational, rarely unerring, and never omniscient. So let us return to the model introduced in Section 6, and reshape it into practical form.

DuRose, Jr., pages 169-171; and Longley-Cook's response, pages 174-176, from which the quote is taken.

(C) **Profit**: ISO incorporates a risk load in the determination of General Liability increased limits factors. This risk premium, distinct from the underwriting profit provision, represents a 5-10% return on surplus. See Robert S. Miccolis, "On the Theory of Increased Limits and Excess of Loss Pricing," *Proceedings of the Casualty Actuarial Society*, Volume LXIV (1977) pages 27 ff., and Sholom Feldblum, "Risk Loads for Insurers," *Society of Actuaries Centennial Celebration Volume* (1990), and the references cited therein, for descriptions of risk loading procedures.

Economists and financial analysts have remarked on the inappropriateness of the fixed underwriting profit provision, like the 5% load that ISO uses for General Liability rates. For example, the NAIC Investment Income Task Force wrote in 1984 that "The task force has not been able to find any economic justification for the traditional 5% profit allowance. Without being related in some way to an investment base (either assets or net worth), a return on sales or premium has very limited value as a measure of profitability. . ." [Report of the Investment Income Task Force to the National Association of Insurance Commissioners," in John D. Long and Everett D. Randall (eds.) *Issues in Insurance*, Volume II, Third Edition (Malvern, PA: The American Institute for Property and Liability Underwriters, 1984), page 118]. See also Raymond D. Hill, "Profit Regulation in Property-Liability Insurance," *The Bell Journal of Economics*, Volume 10, No. 1 (Spring 1979) pages 174-175.

The underwriting profit margin indeed lacks theoretical justification, but it is not *a priori* too high or too low. If premium is collected at policy inception, and losses are valued as of the end of the policy year, then a 5% profit margin translates to a 10% return on equity at a 2 to 1 premium to surplus ratio. Only in conjunction with nominal loss values is a 5% profit margin unreasonable.

Thus, ISO's General Liability rates are well above market prices in most years. Insurers discount these rates based on competitive pressures. They are constrained by marketplace forces, not by actuarial indications.

As before, let P^m be the current *market* price, P^c be the *competitive* price, and "v" be a discount rate for future earnings. E^m, a positive amount, represents industry earnings at the current market price of P^m. E^c, which equals 0, represents industry economic profits at the competitive price of P^c. Each firm in this hypothetical two firm industry knows that if it reduces its price below P^m, its rival will immediately and continuously charge P^c. Furthermore, a price cut below the current market price promptly attracts the entire consumer population.

If both firms maintain the current market price, P^m, earnings are $(E^m + vE^m + v^2E^m + \ldots)/2$ for each. If either firm slightly shades prices, its earnings are E^m in the current period. Since its rival quickly cuts prices to marginal cost, however, its earnings are 0 in all future periods.

If the firms are to be dissuaded from cutting prices, then E^m must be less than $(E^m + vE^m + v^2E^m + \ldots)/2$. That is,

$$1 < (1 + v + v^2 + \ldots)/2, \text{ or } v > 1/2.$$

Competitive Reactions:

(1) **Severity:** This model presumes that the competitive reaction to price shading is an immediate and lasting price cut to marginal cost. In theory, this is true: the "optimal" competitive threat is that which indefinitely eliminates all industry profits.[66] In practice, it is silly. Price shading inevitably occurs: when new firms enter the market, when incumbent firms believe that they have sustainable advantages, when demand changes cause an overall expansion or contraction of the market, and in numerous other situations. Firms do not cut their own throats to spite their rivals.

Rather, businessmen seek to remedy problems, not simply to avoid them. If a firm shades prices, its rivals may react with their own price cuts. But the intention is always to restore "industry discipline" and adequate rates, not to eliminate all profits.[67] Businessmen prefer negotiation to bloody battles.

Furthermore, firms are rarely certain why rivals cut prices. Is this an attempt to gain market

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[66] For a mathematical demonstration, see D. Abreu, "Extremal Equilibria of Oligopolistic Supergames," *Journal of Economic Theory*, Volume 39 (1986), pages 191-225.

[67] See, for example, E. J. Green and R. H. Porter, "Noncooperative Collusion Under Imperfect Price Information," *Econometrica*, Volume 52 (1984), pages 87-100.

share, or a reaction to a drop in demand?[68] Economic markets are stochastic: random factors influence supply and demand. Firms do not react at the first suspicion of a rival's move. Only after evidence of aggressive behavior piles up do rivals respond drastically to the competitive threat.

Thus, firms know that their rivals will not try to indefinitely eliminate industry profits. Such a competitive threat is never credible, and so can hardly be the "optimal" one. In our model of underwriting cycles, the severe reduction of premiums at the nadir of the cycle is designed to restore "industry discipline." It is a *post hoc* remedy to aggressive competition. It is not merely an *ante hoc* prophylactic.

(2) **Observability:** Some models presume that rival reactions to competitive moves are so strong that they are never actually realized. The initiating firms anticipate these devastating consequences and so avoid actions that would precipitate them.[69]

Businessmen learn from experience, not from textbooks. Insurance executives learn their rivals' behavior by studying their past actions, not by attending seminars in industrial economics.

Moreover, businessmen are optimistic. They believe that they can outwit and outmaneuver their rivals, that they can gain market share and still earn economic profits. They do not share the academic's egalitarian view: that all businessmen are equally capable, and only technical or strategic advantages improve performance. Only hard facts of past competition dissipate the businessman's rosy perspective.[70]

The model of underwriting cycles presented here assumes that business strategies develop from experience. Alternative high and low prices, and the resultant profit cycles, occur throughout the industry. Firms formulate and refine their business strategies by observing actual events,

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68 See, for example, J. J. Rotenberg and G. Saloner, "A Supergame-Theoretic Model of Price Wars During Booms," *American Economics Review*, Volume 76 (1986), pages 390-407.

69 See Jean Tirole, 1988, *op. cit.*, Chapter 6. Not only are such models unrealistic, they are untestable, since they are not refutable. They predict certain reactions to competitive behavior, but they also predict that these reactions will not be realized. See Karl R. Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge* (New York: Harper and Row, 1968), for a comparison of testable versus untestable economic hypotheses.

70 This is particularly true in complex service industries like insurance. Almost all carriers believe that they have superior underwriting skills, superior service capabilities, superior customer relations, and so forth. Outside studies that do not support such assertions are casually dismissed inside the firm.

not by theorizing about "optimal" occurrences.[71]

(3) **Omniscience:** Economics graduate students strain mightily as they solve game theoretic problems in oligopolistic pricing models. They presume that all firms know each others' strategies, and only the Nash equilibrium need be discovered.

Such difficulties vanish outside the university walls. Firms have vague knowledge of their rivals' strategies (about which even these rivals themselves are sometimes in the dark). The businessman presumes that his rivals seek to expand their markets and increase their profits. At times, he will anticipate his rivals' *tactics*, such as initial reactions to a new sales office. But he can do little more than guess at their long-term strategies.

Moreover, businessmen often presume that many rivals are "naive," lacking clear goals and direction. Actual business strategies, like those postulated in our model of underwriting cycles, anticipate such naivete. They do not presume that all rivals are rational and omniscient firms that effectively counter all competitive moves. On the contrary: they assume that at least some rival firms strive for short-term gains, even if long-term earnings suffer. "Optimal" business strategies suppose that rivals are businessmen, not theoretical economists.[72]

The model of underwriting cycles presented here is a realistic model. It begins with the observed historical patterns, and it asks: "What strategies are implied by these facts? And do such strategies make sense?" But it is a "fuzzy" model, because business strategies are often vague, unformulated, loosely defined. No two insurers respond identically to competitive pressures. Accordingly, underwriting cycles vary in intensity and duration, depending on various market and social conditions (e.g., market power of individual carriers, restrictiveness of regulation by line of business). So let us move on to a description of the model.

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[71] Economists differentiate between static and dynamic models. Static models assume a single period time horizon. Dynamic models assume two or more periods. Competitive moves depend not only on business strategies but also on rivals' actions in earlier periods. See Jean Tirole, 1988, *op. cit.*, pages 239-270.

In truth, both of these types of models are static, whether they are single period or multi-period. They assume that business strategies do not change, so all behavior is predetermined from the outset. The model of underwriting cycles in this paper, however, is indeed dynamic. It presumes that businessmen learn from experience, and accordingly change both their strategies and their actions.

[72] We do not postulate that all or most firms are "naive." We presume only that some of them are. A model may predict that since all firms are rational, none will shave prices. But if one firm reduces its price, it is rational for others to follow suit. A realistic model must *anticipate* that some firms will act naively, and others will respond to the new situation. An equilibrium that obtains only when all firms act "rationally" rarely occurs in practice.

SECTION 9: THE UNDERWRITING CYCLE

Profit Cycle Forms:

Profit cycles take one of two forms. (1) In the first form, the marketplace is in equilibrium during one phase of the cycle. External influences change costs, supply, or demand and thereby shift expected profits. Disequilibrium results, and the price mechanism forces profits back to the original level. If external influences again affect the market, the cycle starts anew.

Such profit fluctuations are rarely cyclical. For instance, such factors affect certain agricultural products, where weather conditions affect supply. An unexpected frost may damage citrus fruit production, or a severe drought may lower crop supply. The affected farmers suffer from lost production; other farmers benefit from higher prices. But although prices and profits fluctuate, the pattern is not cyclical.[73]

(2) Underwriting cycles take the second form. No phase is in equilibrium. Insurer strategies during profitable years drive rates down; changed strategies during poor years push rates up.

At two points in the cycle, in the upswing and the downturn, prices pass through the same point. But the underlying forces are different. One reflects a downward driving price strategy founded on high rates; the other reflects an upward driving price strategy founded on inadequate rates. This difference may be missed by an outsider looking at a snapshot of industry income. But the disparity is keenly felt by the businessman struggling for profits.

If there is no equilibrium point, there is no good place to begin analyzing the cycle. Yet we must start somewhere. So we begin, perhaps arbitrarily, at the top: income is high and all insurers are satisfied.[74]

Entry and Exit:

Satisfaction breeds desire. Others are enchanted by the "ease" of insurance operations: simply write the policy, collect the premium, and pay less in claims while you invest the assets. There are few explicit barriers to entry, so new firms join the industry.

Figure 5 shows insurance company entries and exits during the past decade. Note the prevalence of entry into an industry earning below average profits and with low growth potential.

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[73] When there are *two* equilibrium points, at high and low prices, the pattern is indeed cyclical. External influences may disrupt either equilibrium point, and the industry may drift to the other. Profits show a cyclical pattern, though the time spent in each phase is random. Such industry patterns, however, rarely occur.

[74] Examples are 1971-72, 1977-78, and 1986-88, when the industry return on equity averaged about 20%. This is not necessarily excessive, but it is twice the historical average.

Moreover, many of these entrants quickly fail. Note how insurance company exits (or "retirements") have tracked the underwriting cycle. They were highest in the unprofitable 1984-85 and 1989 periods, and lowest in the profitable 1980-82 and 1987 periods, as shown in Figure 5.[75]

**Figure 5: Insurance Company Entries and Exits**
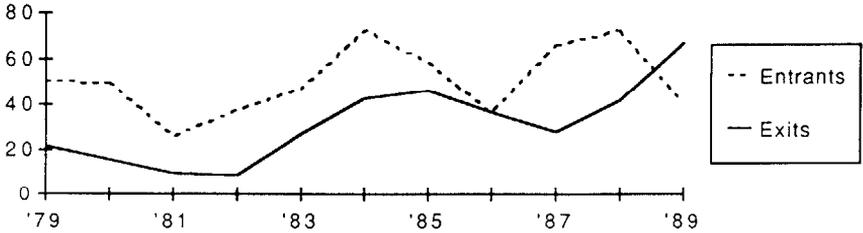
New insurers can not sell their policies at the going market rate. Entrants must discount prices in any industry. This is all the more true in insurance, where it is hard to attract new customers. But new firms believe that they have little to lose by charging lower rates. They have no income now, so any price above marginal cost is additional profit.

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[75] See Lawrence J. Stern, "Corporate Changes 1989," *Best's Review: Property/Casualty Edition*, Volume 90, No. 11 (March 1990), pages 20-22.

Robert Nelson presents the following data on combined ratios and stock company exits for 1957 through 1967:

Figure 6: Combined Ratio (left) and Stock Company Exits (right)
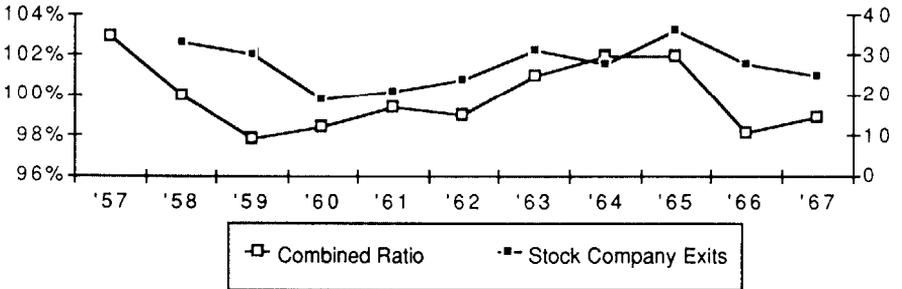
He observes that the number of exits is correlated with the combined ratio with a lag of one year. See Robert E. Nelson, "Property-Liability Company Exits," *Journal of Risk and Insurance*, Volume 38, No. 3 (September 1971), pages 357-366.

Price Shaving and Market Shares:

New entrants charging low rates is a new force, although an unwelcome one to incumbent firms. Even more important, though, is the change in strategy among existing insurers.

The model presented in section 6 assumes an equal division of the market among suppliers. Suppose, instead, that there are 10 firms: one has 50% of the market, 8 have 6% of the market, 1 has 2% of the market, and the appropriate discount rate is 10% per annum. Let us restore the ideal assumptions for a moment: if any firm cuts prices it immediately attracts all consumers. Moreover, if any firm cuts prices, its competitors will reduce price to marginal cost in all future periods.

The large firm presently earns 50% of the industry's economic profits. If current pricing continues indefinitely, it will earn this amount in perpetuity. Using the notation of section 6, where "PM" equals annual economic profits at the market price, and "v" is the discount rate, the present value of this profit stream is $50\% * PM * (1 + v + v^2 + \ldots)$, or $5 * PM$, since the discount rate is 10%. If it cuts prices, it earns PM in the current year, but 0 economic profits in all future years. The large firm has an incentive to continue the present pricing strategy.

Now consider the firm with only 2% of the market. It presently earns 2% of the industry's economic profits. If conditions do not change, it will earn this amount in perpetuity. The present value of its profit stream is $2\% * PM * (1 + v + v^2 + \ldots)$, or $0.2 * PM$. If it cuts prices, it earns PM immediately. The small but aggressive firm has a strong incentive to cut prices.

It is time to add realism to the model, to transfer it from the theoretical economist to the practicing actuary. The small firm will not instantly capture the entire market with a small price reduction. Not only are most policyholders loyal to their current insurers, but they rarely consider competitors' rates at renewal time. The small firm's rate decrease would slowly increase its market share: say, 10% a year. The gain is substantial, but it is not immediate or overwhelming.

The large firm expects different outcomes. A firm with 50% of the market may have already saturated some of its target customer populations. Even if it would like to grow rapidly, there are fewer new insureds for it to attract. The large firm's rate reduction may increase its market share only 1% a year.

Competitive responses to rate cuts by a small firm or a large firm also differ, particularly in insurance. Premium rates vary by classification, territory, type of coverage, and so forth. Rate comparisons can be an exhausting task, especially when the classification schemes of the two insurers differ. So carriers do not monitor premium rates of small companies. In Personal Auto insurance, the rates charged by State Farm, Allstate, and a handful of other large carriers are carefully analyzed. The rates charged by other insurers are revealed only in industry-wide accounting statistics.

Moreover, rivals do not react swiftly to rate cuts by small insurers. If a firm with 1% of the market has a 10% growth in business, and the new business is drawn evenly from its rivals,

then the other firms suffer only a 0.1% decrease in volume. If a firm with 50% of the market has the same growth, its rivals lose 10% of their business.

Thus, when rates are high, small firms are tempted to cut prices aggressively. Their actions may not be noticed, responses of rivals will be delayed, they may increase market share rapidly, and their profits will climb. Large firms, however, have no incentive to reduce rates. Their market share would increase more slowly, their actions would be quickly noticed, competitors will respond swiftly, and the premium lost on existing business might exceed that gained on new insureds.

The profitable phase of the underwriting cycle is in disequilibrium. Some firms enjoy current earnings, others aggressively seek to grow, and entrants clamor to join the industry.

Competitive Strategies:

Profits influence business strategies. As the profitable phase of the underwriting cycle continues, more firms ignore short term income and seek growth. For simplicity, let us differentiate strategies between (a) *aggressive growth* and (b) *price maintenance.* Assume that at time "t," w% of firms have strategies emphasizing aggressive growth and (100 - w)% of firms emphasize price maintenance. Moreover, the change in "w" depends upon the sign and magnitude of economic profits, labeled "p" here. If economic profits are positive, or "p" > 0, then $(dw/dt) > 0$. In other words, when insurance seems profitable, more firms seek aggressive growth. Moreover, the larger the economic profits, the more rapidly this change occurs, or $(d^2w/dtdp) > 0$.

The price maintenance strategy is not sustainable. If your rivals are cutting prices and gaining market share, you must either respond or disappear. But the optimal response depends on the number of firms reducing rates. If "w," the number of firms aggressively seeking market share, is small, then it is reasonable to hold prices above marginal cost. The high level of policyholder loyalty to the insurer means that insurance market share growth is a slow process. Suppose that $w = 10$: that is, 10% of firms are aggressively cutting rates. (For simplicity, assume that firms are of equal size, so 10% of firms means 10% of the market.) If such discounts provide a 10% annual growth in market share, then these firms will have 11% of the market after a year's time, and their rivals will remain with 89% of the market. The maintenance of high prices has led to a 1% reduction in market share - a small loss for current profits.

If $w = 50$, or 50% of firms are aggressively reducing prices, the outcome changes. The same 10% market share growth for these firms reduces their rivals' portion from 50% to 45%. Short term profits can not counterbalance a 10% loss of business.

The Nadir of the Cycle:

So how might one respond? Following rates downward is no remedy. The insurance industry has thousands of firms, a competitive structure, and invitingly easy entry conditions. Expected profits would be extremely low if prices were left purely to market pressures.

Indeed, premium rates do not drop slowly when the cycle heads downward. Rather, prices cascade downward, to well below marginal cost. Industry wide Annual Statement operating income was negative in 1975 and again in 1984-85. Such operating ratios conceal the true severity of underwriting cycles, for several reasons:

(1) First, accounting data does not include a "reasonable profit" margin, though the economist's marginal cost does.[76]   (2) Second, reserve strengthening and weakening smooths the profit cycle in financial reports, as discussed in Section 2 above. True operating losses are more severe than Annual Statement exhibits reveal.

It is difficult to quantify these effects, since the "reasonable insurance profit margin" is much disputed and reserve strengthening and weakening is difficult to quantify. Nevertheless, rates were surely below marginal cost during 1974 and 1983 as well.

(3) Third, the severity of the cycle differs by line. General Liability rates, for example, were below marginal cost in 1982 and perhaps in 1981 also (see Section 2 above). In other words, an accurate analysis of income *adjusted for reserve changes* by *line of business* with a *reasonable profit provision* shows severe price inadequacies for years in a row.

To recapitulate: during profitable years, there are incentives for small firms to aggressively seek market share and for new firms to enter the insurance industry. The lack of product differentiation, the positive cash flow from insurance operations, and the ease of entry would normally reduce or eliminate profits from the industry. Restrictive rate regulation in several jurisdictions compounds the economic pressures which reduce prices.

Yet total consumer demand for insurance is inelastic with respect to price. The difficulty of price comparisons and consumer loyalty to insurers provide a large *potential* profit margin.

The deciding factor is business strategy. If firms aggressively seek market share by cutting rates, profits quickly decline for all insurers. Yet formal agreements to maintain high prices are not sustainable in an industry as competitive as insurance. Rather, *small firms and new entrants may be dissuaded from pursuing overly aggressive strategies by the competitive reactions of incumbent insurers.*

Thus, the downward rate spiral is not a reflection of simple competitive pricing. Rather, it is a *competitive response to aggressive strategies.* By temporarily cutting rates below marginal cost, incumbent insurers hope to persuade more aggressive but short-sighted firms to modify the focus of their strategies from market share to profitability.

Changing Strategies:

Indeed, as operating profitability decreases, overly aggressive insurers begin to rethink their strategy. First, low prices no longer attract additional consumers, since even the major firms have cut rates. Second, if profits remain negative, all firms will suffer financially.

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[76] See, for instance, Evan J. Douglas, *Intermediate Microeconomic Analysis: Theory and Applications* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1982), pages 148-150.

The changes in insurer strategies are revealed in the insurance trade press and trade conferences. As the cycle deepens, executive laments on the evils of price cutting become frequent, and exhortations to refrain from the unprofitable pursuit of premium abound. These public proclamations are disavowals of aggressive intentions. Insurers say: "We renounce the use of rate reductions to gain market share, for we see the folly of our ways."

We can model the change in strategy as follows. As the trough of the underwriting cycle continues, more firms renounce market share gains and seek profitable business. As before, we differentiate strategies between aggressive growth and price maintenance. Assume that at time "t," w% of firms have strategies emphasizing aggressive growth and (100 - w)% of firms emphasize price maintenance. The change in "w" depends upon the sign and magnitude of economic profits ("p"). Since economic profits are negative, or "p" < 0, (dw/dt) < 0. In other words, when insurance seems unprofitable, more firms renounce aggressive growth and seek profitable business. Moreover, the larger the economic losses, the more rapidly this change occurs, or $(d^2w/dtdp) > 0$.

Industry Discipline:

When the cycle turns up, insurers who previously engaged in competitive "warfare" seem to raise rates in unison. Politicians, consumer activists, and the legal community suspect antitrust violations. But there is no collusion, no intercompany agreements, and only a general knowledge of competitors' intentions.[77]

Rather, the change in behavior reflects the change in strategy. The public exhortations during the trough of the cycle are **not** accompanied by rate increases. Each insurer knows that if it raises prices unilaterally, it will lose business, not return to profitability. In fact, most insurers always knew that severe rate cutting is destructive to the industry. The public statements are intended to persuade other firms to cease overly aggressive behavior. They are not explanations of any firm's current actions.

Consider again the formal model. If economic profits are sufficiently negative long enough, most firms will have shifted their emphasis from market share growth to maintaining high and profitable rates. Yet a high price maintenance strategy is profitable *only if all or most firms in the industry follow this path*. Indeed, after two or three years of prices below marginal cost, most firms are committed to writing profitable business. But how does one move from a low price situation to a high price situation?

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[77] See the class action antitrust complaint filed by John K. Van de Kamp, et al. in *The State of California versus Hartford Fire Insurance Company, et al.* (March 1988, The United States District Court for the Northern District of California) and the pamphlet issued in response by the Insurance Information Institute, *Insurance Antitrust Litigation: The Conspiracy Theory and Related Policy Issues* (New York, April 1988) for illustrative expressions of this debate.

Market Leaders:

In a highly competitive and fragmented industry like insurance, firms can not easily monitor the actions, much less the strategies, of their rivals. They need a barometer of industry feelings.

Rate filings make dull newsprint. "The Automobile Insurance Company has requested a 5.1% rate increase in Arizona for Bodily Injury coverage, 4.3% for Property Damage, . . ." Who would ever read such details?

The National Underwriter periodically records State Farm's rate filings (and only State Farm's filings) in various jurisdictions. State Farm is the market leader and low cost carrier in Personal Lines coverages. It serves as the barometer of industry movement through the underwriting cycle.[78] By examining and following State Farm's actions, other firms maintain a close grasp on industry price movements, even if they lack the resources to monitor competitive rates on their own.

When other Personal Lines carriers see State Farm seeking rate increases, they know that firm strategies have shifted sufficiently to allow maintenance of high prices. Insurers follow (or sometimes even anticipate) the market leader in the various jurisdictions, leading to the good years of the cycle.

In the Commercial Lines, there is no clear market leader. The major Commercial Lines insurers, Aetna, Travelers, Hartford, AIG, Liberty Mutual, and CIGNA, have relatively small countrywide market shares. Other carriers do not follow AIG's General Liability rates the way they examine State Farm's Personal Auto rates. Consequently, the National Underwriter rarely mentions Commercial Lines rate actions.[79]

Rather, insurer strategies are reflected by deviations from bureau rates in the Commercial Lines. The National Council on Compensation Insurance (NCCI), and state bureaus in certain

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[78] Moreover, State Farm has a sophisticated monitoring system to analyze the rate actions of its peer companies. Not only do State Farm's rates affect a large percentage of the insured population, but they are an accurate reflection of the strategies of the major Personal Lines carriers.

[79] Personal Lines risks are manually rated, so State Farm's rate manual is an accurate reflection of marketplace prices. Large Commercial Lines risks are often loss rated, composite rated, or written under cash flow or retrospective rating plans. The rate manual is a crude guide to actual prices. In fact, the General Liability rate manual lists many classifications as "A-rated," so there are no manual rates to examine.

In the Personal Lines, price changes are effected by rate filings. In the Commercial Lines, price changes are effected by varying schedule rating credits and debits, by modifying the premium payment pattern, by changing policyholder dividend plans, and by similar "non-manual" methods. Thus, rate comparisons are more difficult in the Commercial lines of business.

jurisdictions (such as California, Massachusetts, and Pennsylvania), provide advisory Workers' Compensation rates for all classifications. Similarly, the Insurance Services Office (ISO) provides advisory rates or loss cost data for the other Commercial Lines.[80] Most insurers use NCCI or ISO rates as a benchmark, and file rate deviations with state insurance departments.

After several years of unprofitable operations, insurers know that the industry is ready to increase rates. ISO (or another rating bureau) provides the catalyst. For example, ISO may be granted a Products Liability rate increase. If private insurers follow ISO, without seeking major deviations, firms know that the industry is committed to profitable rates. The individual carriers may then curtail schedule rating credits and other price modifications, confident that their rivals are doing the same.

Profits encourage aggressive rate cutting. After one or two "good" years, insurer strategies begin emphasizing market share growth, and new firms are attracted to the industry. So the cycle begins anew, in perpetual disequilibrium.

SECTION 10: IMPLICATIONS

We began with the questions that insurers ponder: "What determines the severity and frequency of underwriting cycles? What lines of business are most subject to them? How do state regulation and statutes influence them?" It is time to answer these questions.

Several characteristics of insurance drive underwriting cycles. Some affect the industry as a whole, such as the large number of firms, the apparent ease of entry, and the difficulty of monitoring rivals' prices. Others affect particular lines, such as the potential profits during periods of high prices, the low price elasticity of demand for insurance, and policyholder loyalty to the insurer. The severity and frequency of underwriting cycles varies with the strength of these characteristics.

Policyholder Loyalty and Price Elasticity:

Consider the latter set of attributes: potential profits, inelastic demand, and policyholder loyalty. Were economic profits unattainable, underwriting cycles would not occur. Why drive rates down and lose money for years in a row if you can not recoup the losses during the profitable periods? Firms would prefer to price at marginal cost rather than lose money over the long term.

Periods of high prices are sustainable only if consumers do not reduce their purchases of the

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80 ISO provides advisory rates or loss cost data for the Personal Lines as well. However, about 70% of Personal Lines risks are written by "independent insurers," so ISO's rates and loss cost data have only a minor effect on marketplace prices.

good and do not switch to rival suppliers. In other words, the price elasticity of demand must be low enough that consumer demand will not drop substantially when suppliers raise prices.

Policyholder loyalty results from the difficulty of price comparisons. When rivals slash prices, policyholders are usually unaware of the changes, since they rarely price shop at renewal time. An insurer can maintain high prices for a *short* period without a significant loss of market share when its competitors begin cutting rates.

Price increases, however, encourage insureds to seek better rates elsewhere. *Unilateral* price increases cause a loss of market share, as consumers switch to rival suppliers. Industry-wide price increases are easier to sustain, since consumers can not do better elsewhere in the marketplace. Thus, the descent to the trough of the cycle may be precipitated by a small group of firms, but the return to profitability is a uniform rise in rates by all insurers.

The history of underwriting cycles in America illustrates these relationships. During the 1960's and 1970's, underwriting cycles were most pronounced for Personal Automobile and Workers' Compensation insurance.[81] In the 1980's, General Liability and other commercial liability lines showed the greatest fluctuations in profitability: negative in 1981-1984 and highly positive in 1986-1988.

Personal Automobile and Workers' Compensation are statutorily mandated, by either Financial Responsibility or compulsory insurance laws.[82] Thus, price elasticity of demand is low.

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[81] See Barbara Stewart, "Profit Cycles in Property-Liability Insurance," 1984, *op. cit.*, Exhibits 5-3, 5-4, and 5-8 on pages 290, 291, and 295. Note how the cycles in automobile insurance mirrored those for the industry as a whole, whereas General Liability showed no clear pattern until the late 1970's.

[82] Financial Responsibility laws require a driver involved in a motor vehicle accident either to show evidence of insurance or to post a court bond. Such laws have been enacted in most states, and almost all drivers choose the first option. For details, see Robert I. Mehr and Emerson Cammack, *Principals of Insurance*, Seventh Edition (Homewood, Illinois: Richard D. Irwin, Inc., 1980), chapter 14, "Automobile Insurance," pages 308-329, or David L. Bickelhaupt, *General Insurance*, Tenth Edition (Homewood, Illinois: Richard D. Irwin, Inc., 1979), chapter 23, "Automobile Insurance - Fault and No-fault," pages 646-678.

Statutes in all states require employers to obtain Workers' Compensation insurance, with minor exceptions relating to farm employment, household work, or businesses with few workers. Employers financially strong enough to self-insure may provide the statutory benefits on their own. For history and detail, see Robert J. Myers, *Social Security*, Third Edition (Homewood, Illinois: Richard D. Irwin, Inc., 1985), chapter 14, "Workers' Compensation Programs," pages 884-900, or C. A. Kulp and John W. Hall, *Casualty Insurance*, Fourth Edition (New York: John Wiley & Sons, 1968), chapter 8, "Workmen's Compensation Principals," pages 191-250.

The opposite was true for General Liability until the 1970's. Believing that they had little exposure to liability hazards, many small businesses declined to purchase the coverage. Large corporations often used alternative risk management techniques, such as self-funding and captives.

In the 1950's and 1960's, many Personal Lines insurers used bureau rates, either as actual rates or as a baseline for pricing. Since bureau rates were above marginal cost, potential profits were available. (Of course, these profits were dissipated during the troughs of the cycle.) By the 1980's, the low cost direct writers, such as State Farm, Allstate, Nationwide, had garnered most of the Personal Lines market. The efficient distribution systems of these insurers formed strong barriers to entry or expansion by other firms.

The opposite course has characterized the Commercial Liability lines of business. The major direct writers have not yet penetrated these markets (with the exception of State Farm's entry into the small businessowner's market and Liberty Mutual's position in Workers' Compensation).[83] Meanwhile, the lengthening tails in these lines (most pronounced in the Products and Professional Liability lines), and the rising interest rates in the 1970's, increased the disparity between bureau rates and marginal cost.[84]

Regulation and Social Developments:

Changes in state regulation have had strong effects on underwriting cycles. During the 1960's and early 1970's, the states moved away from prior approval regulation and substituted "open competition" laws. In 1968, the National Association of Insurance Commissioners explicitly

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Many states allow group self-insurance in Workers' Compensation, though statutory restrictions in some jurisdictions impede the effectiveness of such groups. This increases the price elasticity of demand, since consumers have another risk management technique. See the NAIC Study Committee Report, "Regulating Workers' Compensation Groups," in John D. Long and Everett D. Randall (eds.), *Issues in Insurance*, Volume II, Third Edition (Malvern, PA: The American Institute for Property and Liability Insurance, 1984), pages 1-110 for a full description.

[83] Note that when Allstate expanded into the Commercial Lines, it formed a subsidiary, Northbrook Insurance, that uses the agency/brokerage distribution system.

[84] Reinsurance seems to be following the Personal Lines pattern. The major agency market, Lloyd's of London, is slowly withdrawing from American Commercial Liability lines. The major direct writer, General Reinsurance, is swiftly expanding as a low cost supplier. Reinsurance treaties were once "gentleman's agreements," with long-term relationships between ceding and assuming companies. Such "ceding company loyalty" is eroding, as primary insurers seek low reinsurance rates. In other words, the severity of the reinsurance underwriting cycle, which is now quite strong, may decline if the market concentrates among a few low cost suppliers.

supported the emergence of open competition rate regulation.[85]   Even New York and Massachusetts, the exemplars of strong insurance regulation, had brief episodes of open competition in the Personal Lines of business in the 1970's.   Competitive rating laws allow more freedom for private insurers to vary premium rates in attempts to gain market share or increase profits.

The 1980's showed the opposite trend.   California adopted prior approval regulation in November 1988, with the passage of Proposition 103.[86]   Consumer groups in other states are pushing similar legislation, and many insurers anticipate more restrictive regulation. Meanwhile, the low cost direct writers are pushing agency companies out of the Personal Lines market.   The tighter governmental regulation and the increasing market concentration may dampen the severity of Personal Automobile underwriting cycles.

Social developments in the 1980's have had the opposite effect on the Commercial Liability lines.   The expansion of tort law doctrines, and the increasing unpredictability of jury awards, have caused even small firms to view commercial liability coverage as essential.   State regulation is not restrictive, since commercial insureds can "fend for themselves" and do not need the governmental protection that ordinary citizens require.[87]   Commercial liability rate filings are infrequently contested by state regulators, in contrast with bitter disputes for Personal Automobile insurance rates.

Consequently, General Liability promises potential profits for the discerning insurer.[88] In the

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[85] "It is the sense of the Subcommittee . . . that . . . reliance be placed upon fair and open competition to produce and maintain reasonable and competitive prices for insurance coverages . . ." (*Proceedings of the NAIC*, 1969, page 310).   See also the report of the Department of Justice to the Task Force on Antitrust Immunities, *The Pricing and Marketing of Insurance*, (January 1977), which arrived at similar conclusions.

[86]   Prior approval officially began in November 1989, though restrictive regulation, rate rollbacks, and rate freezes began to take effect during the preceding year.

[87]   In the mid-1980's, insurers feared restrictive state regulation of the Commercial Liability lines in New York and Florida, though these worries now seem premature.   The March 1988 class action antitrust complaint filed by the Attorneys General of eight states against various private insurers, reinsurers, and insurance trade associations was dismissed in September 1989 by the Federal District Court in San Francisco (though the decision is being appealed).   In sum, even the severe rate hikes in the early 1980's for Commercial Liability coverage have not led to lasting governmental regulation.

[88]   See Sholom Feldblum, "Competitive Strategy for Property/Liability Insurers," *CPCU Journal*, Volume 41, No. 1 (March 1988), pages 43-51.   This promise may prove illusory. Insurers who provided CGL coverage in the 1960's and 1970's are facing enormous asbestos, pollution, and products liability litigation in the subsequent decades.   Nevertheless, the

late 1970's, insurers complained vociferously about rising and unjustified liability awards. The criticism was correct: the American legal system encourages lawsuits and the redistribution of wealth from the public to the trial bar. But a strategic, if secondary, effect of these complaints was to impress upon businesses the need for liability coverage.

Numerous suppliers - major carriers, small firms, and new entrants - joined the fray, and insurers began "positioning" themselves (that is, cutting prices to build market share) for the anticipated profits. The aggressive competition threatened to eliminate the foreseen returns.

So General Liability entered the trough of a severe underwriting cycle, with firms slashing rates well below cost. The consequences were striking: by 1985, insurers were able to raise General Liability prices in unison, with an almost complete absence of aggressive price cutting.[89]

And the cycle continues. The aggressive competition that precipitated the rise in rates in the mid-1980's led to price cutting a few years later. As the influence of rating bureaus and administered pricing systems wanes, and as long as the market remains unconcentrated, we should expect even more severe swings in premiums.

SECTION 11: PUBLIC POLICY

An analysis of profitability in a regulated industry might be considered incomplete if it offered no recommendations for public policy. This is particularly true regarding insurance, since rate fluctuations and alleged economic profits have inflamed the passions of both legislators and citizens in recent years.

The recurring *industry* concern about insurance underwriting cycles is "How might they be eliminated?" The preceding sections show how misplaced this concern is. Underwriting cycles are a strategy for maximizing long-term profits; they are not a phenomenon to be avoided. The

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potential is alluring.

[89] The power of underwriting cycles is often misunderstood. Much of the American legal community and the business public concluded that the dramatic and uniform rise in commercial liability insurance rates must be the result of collusion. Yet no evidence of such behavior could be found. In fact, collusion is practically impossible in the fragmented insurance market.

Even the Attorneys General's antitrust complaint was confined to allegations of boycott in policy form development, statistical support, and coverage exclusions. Pricing in concert is never mentioned. The California Attorney General's office explains that pricing in concert is protected by the McCarren-Ferguson Act and so was not contested. An alternative explanation is that the Commercial Liability insurance rate increases were characterized not by pricing in concert but by the competition driving the underwriting cycle.

implied wish, the elimination of only the low price phase while retaining the profits of the high price phase, is not achievable.

For the citizenry, and for its public representatives, the elimination of insurance underwriting cycles is equally undesirable. The preceding section suggests three means of doing so, none of which is truly feasible.

Restrictive Regulation:

(1) First, increasingly restrictive rate regulation might remove the potential economic profits and thereby eliminate underwriting cycles.[90]   But restrictive rate regulation increases insurance availability problems more than it reduces potential profits.[91]   Moreover, meaningful rate regulation in the complex Commercial Liability lines of business may not be

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[90]   Empirical evidence is conflicting whether profit fluctuations are greater in states with open competition or prior approval rating laws; see Scott Harrington, "The Impact of Insurance Regulation on Prices and Underwriting Results in the Property-Liability Insurance Industry: A Survey," *Journal of Risk and Insurance*, Volume 51, No. 4 (December 1984), pages 577-623 for a comprehensive review of the literature. The studies that find greater profit fluctuation in prior approval states hypothesize that restrictive rate regulation limits price flexibility.   If states require the approval of rates prior to their implementation, then insurers can less readily effect price modifications in response to shifting costs. The disparity between costs and revenues causes fluctuating profit margins.

This hypothesis agrees with the description of insurer behavior in this paper. But the result differs because of contrary assumptions about the external environment. Rate changes are more difficult in states with prior approval regulation. If trends in insurance costs vary over time, then the lack of price flexibility in prior approval states causes increased profit fluctuations. If the trend in insurance costs is stable, then the pricing flexibility in open competition states allows strategic profit cycles.

As noted above, the empirical evidence is conflicting. In any case, the form of rate regulation has at most a minor influence of the severity of underwriting cycles. And as noted in the text, the disadvantages of prior approval rate regulation overwhelm any positive effects it may have on underwriting cycles.

[91]   Massachusetts and New Jersey have sought to promote social goals by restricting underwriting and pricing freedom in Personal Automobile insurance, but the dislocations in the insurance marketplace have exceeded any benefits. See Paul Joskow, Competition and Regulation in the Property/Casualty Insurance Industry," *Report of the Economic Advisory Panel to the National Commission for the Review of Antitrust Laws and Procedures*, pages 207-227.

realistic.[92]   Unless an industry structure is naturally monopolistic, social welfare fares better with marketplace pricing than with governmental control. This is no less true for insurance than for other industries.

Elasticity of Demand:

(2) Second, one might increase the price elasticity of demand for insurance, by removing statutory requirements for Personal Automobile and Workers' Compensation insurance, and by curtailing judicial awards in commercial liability cases.   But the statutory insurance requirements are intended to help the victims of motor vehicle and workplace accidents. The benefits they provide outweigh the disadvantages of premium rate fluctuations.

The magnitude and unpredictability of judicial and jury awards in commercial liability cases provide little social benefit. Moreover, their harm to society extends well beyond insurance availability and rate fluctuation concerns. Unfortunately, the extremely limited success of tort reform efforts in the early and mid-1980's highlight the intractability of this problem.   To restate this: the trial bar is a powerful and influential interest group that opposes tort reform. The result of the pervasive attorney involvement in insurance claims are bloated insurance costs and the redistribution of wealth from citizens to a particular profession.[93] More volatile underwriting cycles are simply an additional side-effect.

Consumer Information:

(3) Third, greater consumer price information would reduce loyalty to the current insurer and mitigate the severity of underwriting cycles.[94] Firms would not be able to sustain high prices in the face of competitive price cutting without rapidly losing market share. Prices closer to cost would prevail over the duration of the underwriting cycle.

Life insurance regulation demonstrates the difficulty of efficiently providing price comparisons to consumers. States have mandated various cost indices that life insurers must provide at the point of sale, but few consumers carefully examine these numbers. The problem is that such comparisons are extraordinarily difficult, and few individuals are willing to expend the effort needed to understand them.

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[92]   State oversight of schedule credits, for instance, would require a policy by policy review.

[93] See the All-Industry Research Advisory Council report, *Compensation for Automobile Injuries in the United States*, (Oak Brook, IL: AIRAC, March 1989), Chapter 4, pages 77-120.

[94] Numerous studies have recommended that states make insurance price information accessible to consumers. See, for example, the Virginia Bureau of Insurance report, *Competition in the Property and Casualty Insurance Industry* (Richmond, Virginia: January 1978), recommendation #5, page 111, or the "Report of the Advisory Committee on Competitive Rating to the National Association of Insurance Commissioners," *Proceedings of the National Association of Insurance Commissioners*, (1980, Volume II), pages 440-441.

The same is true for Property/Casualty insurance. Consumers do not forgo price comparisons because the information is not available. Rather, the information is not available because the price comparisons are so difficult and distasteful.[95]

In sum, the insurance industry should remember that underwriting cycles are a strategy for increasing profits, not a random occurrence that removes them. Regulators should recall that these profits are still less than those earned in other financial industries. Insurance underwriting cycles are the display of competitive pricing in a free marketplace. They may provide a bumpy ride, but they follow a path of greater benefits for the consumer.

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[95] See Sholom Feldblum, "How Competitive is the P/C Industry?" *Best's Review: Property/Casualty Edition* (February 1988).

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