TOTAL RATE OF RETURN AND THE REGULATION OF INSURANCE PROFITS

١

Irving H. Plotkin

Presented at the May 1979 Meetings of the Casualty Actuarial Society

> Arthur D Little Inc. Cambridge, Massachusetts

> > -206-

I. INTRODUCTION

Beginning in the mid-1960's, increasing regulatory and scholarly attention has been focused on the insurance rate review process with particular emphasis on the determination of fair profits for insurance companies. The cumulative effect of these inquiries has produced a fundamental and sweeping reconsideration by the National Association of Insurance Commissioners (NAIC) and its members of the principles and practices which since 1921 have dominated rate making in property/liability and other lines of insurance. The extensive scholarly and regulatory investigations produced a wholly new understanding of the economic principles that underlie all aspects of insurance price regulation. Areas which heretofore were considered by many regulators, scholars, and the industry as unique and without precedent, were shown to be but specific applications of more general principles of the economics of regulation; questions which had previously been considered within the scope of actuarial science have been shown to require the discipline of financial economics.¹

This paper seeks to explicate the underlying principles currently being used to assess the propriety of the underwriting profit allowance in insurance rates. As a participant in the reformulation of property/liability rate review principles and in the federal and state examination of these principles (as applied to property/liability, title, and mortgage insurance), the author is especially pleased to have this opportunity to review this body of theory and practice.

For example, in a November 28, 1978 Workers' Compensation rate hearing in Texas, actuary Charles Edwards testified that an underwriting profit allowance of 2.5 percent together with the expected investment earnings would produce an excessive rate of return on invested capital for the insurers in his cross-examination on this point, attorney David Irons asked, "Mr Edwards. . you are an economist as well as an actuary?"

II. THE EVOLUTION OF PROPERTY AND LIABILITY INSURANCE RATE REGULATION IN THE UNITED STATES

A. EARLY HISTORY

While the regulation of insurance companies was initially concerned with solvency and next with unfair discrimination, direct regulation of insurance rates began only in the early part of this century. Statutes authorizing the review of statistical gathering and rate-making organizations were enacted in 1909 by the Kansas legislature and in 1911 in New York state.² By 1922 rate regulatory statutes were in force in thirty-five states. This rapid spread of regulatory legislation reflected a combination of the Populist movement and the increasing importance of fire and liability insurance, as well as the growing influence of the rating bureaus.

Although the statutes differed in a number of respects, the general principles governing rate review were simply that rates should not be excessive, inadequate, or unfairly discriminatory. The role played by either total profit or underwriting profit in determining the appropriateness of rates was not explicitly or consistently addressed in these statutes. This glaring lack of legislative instructions gave rise to an often acrimonious debate concerning (1) how insurance profits should be measured (what items should be included), and (2) what constitutes a reasonable *ex ante* or *ex post* value for profit.

In 1921 this issue was "settled" or at least removed from open controversy by actions of the NAIC. The now famous NAIC 1921 Profit Formula stated:

- "1. Underwriting profit (or loss) is arrived at by deducting from earned premiums, all incurred losses and incurred expenses.
- "2. No items of profit or loss connected with the so-called banking end of the business should be taken into consideration. ...

and

"5. A reasonable underwriting profit is 5% plus 3% for conflagrations."³

For a general discussion of the early history, see Mowbray, A.H., R.H. Blanchard, and C.A. Williams, *Jt. Insurance. Its Theory and Practice in the United States.* McGraw-Hill Book Co., New York, 1969.

^{3 1922} Proceedings of the NAIC 19-29

In An Enemy of the People, the great Norwegian playwright, Henrik Ibsen, stated that at the outside a truth lives twenty years.⁴ Perhaps an untruth or an oversimplification lives longer, for the NAIC formula served for almost fifty years.

On its face, the NAIC formula does not deal with an insurer's total income for it explicitly excludes investment income, both the investment income earned on the insurer's surplus and the investment income earned on the insurance float (or the investable value of its policyholder-supplied reserve accounts). In addition the formula was obviously incomplete inasmuch as it addressed only a margin-onsales concept, that is, the 5 percent underwriting profit referred to a rate-making allowance of 5 percent for the ratio of underwriting profit to premiums. (These two basic infirmities in the NAIC formula are discussed below in detail.)

Imperfect as it was, the NAIC formula served as the basis for insurance rate making and rate review from 1921 until the mid-1960's. During the intervening time the question of measuring insurance profitability simmered on a back burner. However, it was addressed in a 1924 report of the National Board of Fire Underwriters and again in 1946 when the NAIC considered the All-Industry Rating Bills. An often cited memorandum of that period, submitted by the New York Insurance Department, became known as the McCullough Report.'

B. FUNDAMENTAL REEVALUATION

The first thorough reconsideration of the question of the measurement and appropriate value of insurer profitability was undertaken in 1966 by researchers at M.I.T. and Arthur D. Little, Inc. The results were

ibsen, Henrik, An Enemy of the People, translated by Eva Le Gallienne. The Modern Library, New York, 1957, p 227

⁴ In Act Four, Dr. Stockmann says

[&]quot;Yes, by Heaven, I am, Mr. Hovstad! I intend to revolt against the lie that truth belongs exclusively to the majority. And what are these truths the majority worships? They're truths so old and worn — they're practically decrept. And when a truth reaches that age you can hardly tell it from a lie! (*Laughter and grees*) You can believe me or not as you like, but truths are not such tough old. Methuselahs as most people imagine. A normal, ordinary truth is good for, say, seventeen or eighteen — at most twenty years, saidom more. And truth as venerable as that are nothing but skin and bones, yet it isn' until then that the greet majority adopts them and prescribes them to Society as wholesome spiritue! food. But there's not much nourishment in that kind of a diet. I assure you, as a doctor you can take my word for that These tired old truths are as rencia and moldly [arc] as last year's bacon, they're the cause of all that more lacuwy that places.

⁵ See 1948 Proceedings of the NAIC 73 While the report bears Mr. Roy C. McCullough's name, it is interesting to note that Mr. Robert E. Dineen is generally believed to have played a major role in its preparation.

reported in a series of monographs;⁶ in papers presented to the NAIC,⁷ the Casualty Actuarial Society,⁸ and the American Risk and Insurance Association;⁹ and in testimony before numerous state and federal legislative and regulatory bodies.¹⁰

Two fundamentals distinguished the Arthur D. Little approach to the problem of insurance profitability from the preceding work and from the strongly held views of the insurance industry and most of its regulators. First, ADL maintained that insurance profitability could not be discussed meaningfully unless all sources of income and accretions in wealth are directly considered and measured. Second, it maintained that the appropriateness of any level of achieved or anticipated profits can be gauged only in relation to the amount of capital invested in the insurance undertaking. In other words, the Arthur D. Little studies focused on an overall rate of return measurement of insurance profitability that included not only underwriting profit but also *all* interest, dividends, rents, and capital appreciation. The ADL studies also compared the insurance industry's rates of return with rates of return earned by all other forms of corporate activity in the American economy.

C. BASIC CHANGES IN REGULATORY PRACTICE

Since its publication, this research has been the topic of numerous hearings before federal and state legislative, judicial, and administrative bodies as well as a host of scholastic papers and reviews. The

- 6 Arthur D Little, Inc. Prices and Profits in the Property and Liability Insurance Industry: Cambridge, Mass., 1967, Rates of Return on the Property and Liability Insurance Industry. 1955-1967 Cambridge, Mass., 1969, Studies on the Profitability. Industrial Structure, Enance and Solvency of the Property and Liability Insurance Industry (two volumes), Cambridge, Mass. 1970.
- 7 Plotkin, Irving H., "Prices and Profits in the Property and Liability Insurance Industry." NAIC, Executive Committee Meeting, March 10, 1988, "Report of Dr. trving H. Plotkin on His Study of the Profit in the Property and Liability Insurance Business," NAIC, Regular Meeting, New Orleans, December 1969; "Key Issue of Insurance Price Regulation," NAIC Special Committee on Insurance Profitability and Rate Making Meeting, Chicago, November 19, 1970. (*The National Underwriter*, January 8, 1971)
- 8 Plotkin, Irving H., "Investment Income In Insurance Rates," Casualty Actuarial Society, Spring Meeting, Monticallo, N.Y., May 19, 1968
- Plotkin, Irving H., "Rates of Return in the Property-Liability Insurance Industry A Comparative Analysis," American Risk and Insurance Association, Annual Meeting, Atlanta, Georgia, August 26, 1968, (*Journal of Risk and Insurance*, June 1969) See also Long, John D., "Comment on the Plotkin Paper," *Ibid.* June 1969.
- 10 For example, testimony of Irving H Plotkin before: Florida State Legislature, Joint Committee on Insurance Rate Making, Legislative Hearing, February 26, 1969, State of Texas House and Senale Insurance Committee, Legislative Hearing, April 1 and 2, 1969, U.S. Senale Committee on the Judiciary. Subcommittee on Antitrust and Monopoly Legislation Hearing, November 25, 1969 (*The Insurance Industry, Itart 17*, 10427-10573, 10589-10591, and *Itari 17*, 10895-11280), State of Texas, Board of Insurance, Remand Hearing, September-December 1970 State of Texas, Board of Insurance, Automobile Insurance Rate Hearing, October 19 and 20, 1970, Massachusetts State Insurance, Hearing on Proposed Protito yLine Reporting, Decomber 11, 1972

- - - -

fundamental result of the investigations of these bodies has been the general adoption of the overall rate of return concept as the underlying principle of insurance rate regulation and review. "

An excellent example of both the debate and its outcome is provided by the hearings in Texas. In 1970 the Texas Board of Insurance considered the dual questions of how to measure, and what constitutes, a fair rate of return to insurance companies. The background to the Board's investigation was one of widespread public dissatisfaction with the high and increasing prices of automobile insurance as well as a number of then recently completed studies of the profit question. These studies included, in addition to those cited above, the report of a 1969 Citizens' Committee appointed by Texas Governor Preston Smith; actions by the Supreme Courts of Virginia, New Jersey, and Oklahoma; a June 1970 report by the NAIC;¹⁴ and the work of a Special Committee appointed by the Board. All the deliberations were well attended and widely covered by local and national news media.

Following an extensive and intensive investigation of this issue, the Texas Board issued several orders, summarizing and implementing its findings and conclusions. The principal conclusion of the Board, as stated in its first order (December 1970) and embodied in all subsequent orders, was:

"...it is appropriate and proper for the Board to consider directly in the rating formula *income from all sources*, including dividends, interest and rents, realized and unrealized capital gains or losses, and then determine the underwriting profit necessary and capable of being realized to produce a fair and reasonable *rate of return* for the insurance companies..."¹⁵

As further guides to the implementation of its general conclusion, the Texas Board also found that:

"It is appropriate to relate Total Income to Total Assets, used and useful, in the casualty and property insurance business because such Total Assets include (1) Net Worth, the stock-

¹¹ See Main, Jaremy, "Why Nobody Likes the insurers," Fortune, December 1970 and Cooper, Robert W, Investment Return in Property/Lability Jaurance Rate Making, Richard D Irwin, Inc, Homewood, III, 1974 See also Greene. Mark R., Ruk and Insurance, 4th Ed, South-Western Publishing Co, Cincinnati, Ohio, 1977, pp 620-624, for a summary of the scholarly debate on the theory and results of profit and risk messurement for the property/liability insurance industry

¹² National Association of Insurance Commissioners, Measurement of Profitability and Treatment of Investment Income in Property and Lability Insurance, Milwaukos, Wis, 1970

¹³ Texas State Board of Insurance, Order No. 14991 (emphasis added).

holders' equity and (2) Liabilities, over 90% of which are loss, unearned premium and other policyholder premium related liabilities. Especially in Texas where Board approved automobile insurance rates are for all types of insurers, stock mutual and reciprocal (excluding county mutuals), we should not confine consideration to stockholders' equity, only."¹⁴

"After all expenses, including premium taxes and Federal Income Taxes, automobile insurance rates should permit a rate of return, taking into account income from all sources, which will be compared to the rate of return for industrial companies reported by Standard & Poor."¹⁵

Applying the above standards to a number of rate filings in both automobile and homeowners' insurance, the Texas Board has concluded that when the effects of the premium-to-capital turnover ratio and investment income from all sources are considered on a ten year average basis, the historic 5 percent pre-tax underwriting profit margin allowance in the automobile rates was consistent with a pro forma reasonable overall total rate of return standard. Other states, following the same basic approach, have arrived at somewhat different underwriting profit allowances. However, the central point is that almost universally the propriety of an insure's underwriting profit allowance is today judged by what it, in combination with other sources of income and the premium/capital turnover, is likely to yield in terms of overall rate of return. No longer is it felt that it is possible to judge the appropriateness of an underwriting profit allowance in and by itself.¹⁶

The validity of these principles in title insurance rate review has been explicitly recognized in a 1975 Order and implemented in two

^{14.} Ibid , Order No. 15309, Exhibit H

¹⁵ Ibid , Order No 14991

^{16.} For a full discussion of the treatment of total income and rate of return in arriving at an underwriting profit allowance for property and liability insurance by the New York State Insurance Department else. 1974 Lows and Expense Ratios in which the Department refers to 'the occasional artificial isolation of underwriting profits (exclusive of investment income) as the criterion of profitability" and decries the fact that this concept (underwriting profit allowance) has been given 'an untoward respectability and currency" (p. 202): New York is arrance Law 176(2) and Regulation 70 (11 NYCRR 165) promulgated pursuant to III, and especially Appendix 15, which prescribe a methodology for measuring insurers' profitability, the Department's lengthy reports, Measurement of Profitability. Property and Liability Insurance. 1972 (passim) and Competition in Property and Liability Insurance. New York State. March 1973, especially pp 44-53; and Thomas A. Harnett, Superintendent of Insurance. Artildavit (Index No 22033/76), Supreme Court of the State of New York, In the Matter of the Application of Juhn R. Junne, Individuality and A. Konrent, Superintendent of Insurance (ormittee and domee March v Thomas A. Harnett, Superintendent of Insurance (New York, In the Matter of the Application of Juhn R. Junne, Individuality and A. Charment of Insurance of the State of New York, Intervention and Liability p. 9

recent rate determinations for title insurance rates in Pennsylvania. The "Order and Adjudication" of the Pennsylvania Commissioner states:

- "b. The appropriate method for establishing the rate of return level which the title industry should be able to achieve includes an analysis of the risk of the title industry as compared with other industries and an analysis of the rate of return needed to attract capital investment.
- "c. An appropriate rate of return determination is necessary to evaluate the proposed rates to assure they are neither excessive nor inadequate through a comparison of the resulting rate of return with that rate of return appropriate for the industry."¹⁷

As a result of the new regulatory approaches, rate hearings are more clearly defined into revenue level and rate structure phases. Revenue level hearings concern the propriety of the overall level of rates and the attendant pro forma profitability. Structural matters concern questions of interpersonal equity among the several classes of insureds covered by any schedule of insurance rates. It is in this structural phase that considerations of actuarially justified classifications (to the extent such may exist) and the overall social impact of the rate structure are brought into focus. This paper is concerned principally with the revenue level aspects of rate hearings.¹⁴

¹⁷ Sheppard, William J., Commissioner of Insurance of Pennsylvania, Order and Adjudication, In re-Rate Films of Pennsylvania Title Insurance Rating Hureau Docket No RT4-1-7, April 28, 1975, p. 13

^{18.} Questions of interpersonal equity arise most clearly in title insurance rate making owing to the crosssubsidy which generally characterizes title insurance rate schedules (see Plotkin, Irving H.) On the Theory and Practice of Rate Reusew and Profit Measurement in Title Insurance, Arithur D. Little, Inc., Cambridge, Messachusetts, 1978, esp. pp. 42-46). The same welfare economics issues are raised by the recent debate on the role of age, sex, and marital status in automobile insurance rate making (see "Report of D Committee," 1978 Proceedings of the NAIC, forthcoming).

III. THEORETICAL FOUNDATION OF MODERN PROFIT REGULATION

A. THE ROLE OF RATE OF RETURN

Price regulation of any product or service stems from the recognition that a profit allowance can be either excessive or inadequate. If either be the case, the public — whose interest the regulator is charged with protecting — is penalized; on the one hand, by overpaying, and on the other hand, by being deprived of the appropriate quantity or quality of the regulated item. Further, all goods and services, whether regulated or not, are subjected to the discipline of the capital markets. As a competitor for the use of capital, the regulated company or industry must ensure that its financial results satisfy not only the concerns of the regulator but also the impersonal requirements imposed upon it by the capital markets

The capital markets react to an industry's or company's rate of return and the quality (or lack of riskiness) of its income stream. This fundamental economic observation was set out as a baseline for regulation by the United States Supreme Court in the now famous *Bluefield* case. The Court held:

"... the actual amount of money invested is to be taken as the basis, and upon this a return must be allowed equivalent to that which is ordinarily received in the locality in which the business is done, upon capital investment in similar enterprises. In addition to this, consideration must be given to the nature of the investment, a higher rate [of return] being regarded as justified by the risk incident to a hazardous investment."

The capital markets, as the allocator of capital across all potential uses in the economy, will channel capital and new business entry into industries that earn higher rates of return and penalize those industries with rates of return inadequate for their risk levels. Because regulated industries must compete with unregulated alternatives for a limited supply of capital and managerial resources, the regulator must ensure that his industry is neither excessively attractive nor unattractive.

The universal standard for judging the attractiveness of any capital employment is the rate of return. Accordingly, the rate of return

Bluefield Water Works & Improvement Co. v. Public Serv. Comm. n, 262 U.S. 679 (1923) at 689-90.
 Soe also, Federal Power Comm. v. Hope Natural Gas. Co., 320 U.S. 591, 603 (1944).

earned by a firm or an industry on its assets is not merely an accounting statistic. It is, in fact, a key element in the laws governing the economic behavior of any corporation or industry. Professor Robert M. Solow, M.I.T.'s world-renowned capital theorist, has commented on the pervasive influence of the rate of return in economic theory in the following terms:

"Thinking about saving and investment from this technocratic point of view has convinced me that the central concept in capital theory should be the rate of return on investment. In short, we really want a theory of interest rates, not a theory of capital. I do not believe that this shift of emphasis makes the theory of capital easy; but I do believe that concentrating on the rate of return leads to clarity of thought, while concentrating on 'time,' or 'capital,' or the 'marginal productivity of capital, or the 'capital-output ratio' has led to confusion. It seems to me that almost any important planning question we wish to ask about the saving-investment process has an unambiguous if perhaps approximate answer in terms of rates of return, whereas the answers sometimes given in terms of marginal products of capital and capital-output ratios are sometimes right, sometimes wrong, and often misleading. I suppose that my point of view could be described as a modern amalgamation of Wicksell and Irving Fisher."20

Through the mechanism of the nation's capital markets the rate of return affects the flow of capital into various economic activities. Professor George Stigler, of the University of Chicago, comments on this in a major study undertaken for the National Bureau of Economic Research:

"The rate of investment is a surpassingly important factor in economic life. The short-run fluctuations in investment are large in amplitude, and they are commonly credited with a dominant influence upon the state of business conditions. The secular growth of capital was long considered to be the basic determinant of the progress of an economy. In modern times there has been a growing tendency to place more emphasis upon the state of technological development as the prime source of progress, but no one has argued that the

Solow, Robert M., Capital Theor. and the Rate of Return, North Holland Publishing Co., Amsterdam, 1963, pp. 16-17 (emphasis in original)

provision of adequate capital is an unimportant part of growth and, in one view, expenditures on research are simply investment in knowledge."²¹

In the same connection we wrote in a study of the risk/return relation in the American economy that:

"The empirical evidence of this study on the risk/return relationship gives weight, we think, to the arguments calling for caution in government regulation of industry. Regulation of one element of an industry's practices cannot be expected to take place in a vacuum. Other changes will result, and they can have a profound effect on the subtle mechanisms controlling the industry's capital allocation, production, and even its viability.

"When the government attempts to control, say, profits of an industry either directly or indirectly (e.g., through administered prices, regulated advertising expenditures, interstate distribution restrictions, or regional marketing rules), there may well be associated shifts in risk taking and capital flow that compensate for the changed expectations and realization of profits. Risk taking on technological developments, the attraction of moving into new competitive environments, and innovativeness may be affected in the newly regulated industry. Its goal may no longer be higher-guality products, if it now faces a high-risk situation which can no longer be justified by the regulated level of return. Research effort may be shifted, where possible, from the theoretical and uncertain projects to the applied and less risky ones. Conversely, if the opportunity to participate in high-risk endeavors is restricted, capital may be diverted to sectors where risks and possible returns are higher."22

Professor Stigler emphasizes in his study the intimate relationship between expected returns and capital flow. "The role of *expected* profit

²¹ Stigler, George J., Capital and Rater of Return in Manufacturing Industries NBER Princeton New Jersey, 1963, p. 72 Throughout this paper, the term 'rate of raturn' is used in its socioeconomic sense of total return to the totality of permanently invested assorts. It may be defined as net income plus lixed charges divided by net worth plus long-term debit and debt (as opposed to seasonal trade credit) in current liabilities (See Section VI for an extended discussion of the proper rates of return to use in regulatory economic matters). This concept of return is operationally equivalent to the one used by Professor Stigler. "Our capital concept is almost all-inclusive it equals total assets excluding investments in other companies, and our rate of return concept correspondingly includes returns to both inders and equiv holders" (*Ibid.*, p. 3).

²² Conrad, Gordon A., and Irving H. Plotkin, "Risk/Raturn, U.S. Industry Pattern," Harcard Basiness Review, March-April 1968, p. 98

rates is crucial in determining the direction and volume of investment, in the traditional theory."²³ While admitting that it is difficult to measure profit expectation when examining twenty years of United States industrial data, Professor Stigler finds a very strong relationship between profits and capital flow into and out of industries. Time and time again, capital and capacity leave low rate of return activities to seek activities that offer higher yields.

B. INADEQUACY OF PROFIT MARGIN

Any rate of return on capital can be expressed as the product of profit margin times turnover, where margin equals the ratio of profits to sales and turnover equals the ratio of sales to capital. Symbolically we may write:

> R = M x T where R = Rate of Return M = Margin = Total Income - Sales T = Turnover ≈ Sales - Capital

Historically insurance regulation had concerned itself only with the underwriting profit margin, which measured the ratio of pre-tax underwriting profits to premiums written. As discussed in the previous section, this standard is now generally agreed to be defective and misleading for it excludes important components of total income and reveals only half the information used by the capital markets and all others in assessing the adequacy of a company's or industry's economic performance.

Even if there were no investment income or income taxes to consider (or in other words, if underwriting profit were equal to total profit), it is obvious that the profit margin alone would not be a sufficient measure of an insurer's attractiveness. Because the value of the capital turnover can and does vary widely among both companies and industries, one cannot predict the value of the rate of return merely by observing the profit margin.

This lack of a consistent relationship between return and margin is illustrated in Figure 1. It presents more than 11,000 company-years of American corporate financial history in terms of achieved rate of return versus achieved profit margin. (Figures 1 and 2 were prepared by the author at the request of the United States Department of Justice and entered into evidence before the United States Court of Claims in

²³ Stigler, op cit , p 83 (emphasis in original)



FIGURE 1 RATE OF RETURN VS. MARGIN 1118 U.S. CORPORATIONS

Source: Developed for the U.S. Department of Justice from COMPUSTAT data.

-218-

E.I. duPont deNemours & Co. v. the United States in January and February 1973. We use these exhibits to underscore the fact that the underlying economic theory is so broadly applicable that it has been used by our Government in a case involving the international aspects of the U.S. Internal Revenue laws.)

In Figure 1 margins are plotted on the horizontal axis while rates of return are plotted on the vertical axis. It is clear from the diffuse scatter of points that one cannot predict the rate of return merely from knowledge of the margin. For instance, a 5 percent margin was consistent with a rate of return as low as 3.75 percent and as high as 42.75 percent.

Because rates of return in the economy tend to have a relatively compact distribution, there generally is an inverse relationship between margin and turnover. That is, all other things being equal, the higher an industry's margin, the lower its turnover and vice versa. This inverse relationship is dramatically revealed in Figure 2, which also came from the above referenced U.S. Court of Claims case. The pattern formed by the scatter of dots is definitely downward sloping. To test this, we fitted the mathematical function best describing that pattern. Its equation is:

log T = .5964 - .0230M+ .0001M² - .3309 log M

As one traverses American enterprise, one encounters very different margins and turnovers but always a trade-off between the two.

Accordingly, the traditional rellance of insurance regulators upon the underwriting profit margin was doubly defective. It lacked an inquiry into other elements of profit as well as into the turnovers generally associated with insurance activity. As discussed in Section II, it is for these reasons that since 1970 insurance regulation has been expanded to consider investment income and capital gains as well as underwriting profits and to consider the establishment of appropriate underwriting profit margins in terms of likely overall rates of return.

The pre-tax underwriting profit allowance continues as a useful and even necessary regulatory tool for rate review. However, the appropriateness of its magnitude in both prospective and retrospective reviews is judged according to its likely impact on overall rate of return. These recent changes in the economic view of rate regulation have, however, made the regulator's task somewhat more difficult. While the pre-tax underwriting profit allowance may still be used, regulators in general realize that its value must be set separately for



FIGURE 2

Turnover = Sales ÷ Total Capital.

Source: Developed for the U.S. Department of Justice from COMPUSTAT data.

-220-

various lines of insurance and, further, may be affected by changes in investment yields, and risk/return requirements (see below), and by turnover. Nevertheless, for reasonable periods, say five to ten as opposed to fifty years, the use of a well thought out underwriting profit margin can promote effective and informed insurance regulatory decision making.

C. THE EFFECT OF RISK

The foregoing discussion has already suggested the existence of a strong relationship between risk and rate of return—a relationship with significant regulatory imperatives. Although risk considerations further complicate the regulator's task, they cannot be ignored.

1. Theory

The theory of pure competition, which is based on a static and certain economic world, lays down as an efficiency criterion the global equalization of marginal return on investments undertaken in every industry. But these results do not hold under the conditions of uncertainty that better reflect the real world economy. Although questions about the existence and uniqueness of equilibrium in an uncertain world are still troublesome to mathematical economists, it is clear that the marginal efficiency requirements of perfect competition are translated into risk-adjusted marginal requirements in the real world of uncertainty.

Modern economic theory and practice argue against the proposition that all industries or all investments should earn on average, or at the margin, the same actual or prospective rate of return. Such a proposition implies that government bonds and uranium stock should both hold out the same prospective rate of return to investors, and that persons should be willing to invest in public utilities or in the aerospace industries for the same prospective rate of return. Such reasoning ignores the important element of risk in all investment decisions and in the determination of the optimal or efficient allocation of capital in the economy.

When an industrial entrepreneur forms a new firm, or finances a new investment, he must attract equity and debt from either his own resources or those of the public. He must convince himself, or other investors, that the prospective rate of return on the capital will be adequate. In this industrial investment, as in the purchase of bonds, the adequacy of the rate of return must be judged in the light of the risks involved. A man will not prospect for gold or oil at the same rate of return that suffices for investing in an electric company, nor will be finance the development of exotic new technology for the same return provided by shoe manufacturing.

Although this attitude toward risk can be demonstrated only empirically, it is more than just the passing fancy of this year's crop of investors, or even this century's crop. It is deeply imbedded in our legal code. Thus, while trustees of an estate are enjoined to invest the funds entrusted to them as profitably as they can, they are judicially warned against seeking return at the expense of taking imprudent risks. The United States Supreme Court, in 1909, stated the problem clearly and forthrightly for the first, but not the last, time with respect to regulated corporations:

"The less risk, the less right to any unusual returns upon the investments. One who invests his money in a business of a somewhat hazardous character is very properly held to have the right to a larger return without legislative interference ..."²⁴

The list of economists who have concerned themselves with the question goes back to Adam Smith and reaches forward to embrace almost all the important economists of our own century, regardless of their persuasion: Joseph Schumpeter, Irving Fisher, Frank Knight, John Maynard Keynes, and such diverse contemporaries as Paul Samuelson, Kenneth Arrow, Milton Friedman, and George Stigler.

Of these, Keynes and Schumpeter deserve special note. From an economist's point of view Keynes' major contribution was his theoretical results. He was also a very practical man, who made (and lost) several fortunes as a practicing investor. As a practical man, Keynes was perhaps the first to make an empirical measurement of attitudes toward risk. Like most first attempts his was crude but he concluded that merchants carrying large inventories of raw materials required a premium rate of return of 10 percent of capital, over and above normal rates of return, because of their exposure to the risk of price fluctuations. Surprisingly enough, work that modern researchers have done in the last few years, using more sophisticated mathematical tools, suggests that Keynes' crude estimate is not far wrong.

Schumpeter's work was different — but nonetheless relevant to the questions faced by insurance departments and other regulatory agencies. Schumpeter was deeply concerned with dynamic problems of economic growth and the role of risk-taking and entrepreneurship on innovation and investment. It was he, more than anyone else, who

²⁴ Willow v Consolidated Gas Co., 212 U S 19 (1909) at 49

stressed that the willingness to innovate played a vital role in the rapid growth and efficient operation of Western economies. Schumpeter also was quick to draw the concomitant conclusion: regulations or legislation that inhibit risk-taking also inhibit innovation and the rate of economic growth.

Neither Schumpeter nor any other responsible economist will argue that industrial abuses should not be corrected, when found. But it is important to remember also that (1) one should not be surprised to find large average profits in risky enterprises, (2) one should not take such profits as evidence of abuse of market power, and (3) one must eliminate only excessive returns and not necessary returns on investment, if one does not wish to strike at the wellsprings of risk-taking and growth. For should the rate of return be reduced below that commensurate with the risk involved, the industry will not attract the same volume of capital, or investors will reduce their exposure to risk by a greater conservatism or sluggishness in pushing down uncharted paths.

2. Empirical Results

Despite these economic injunctions, courts have had difficulty implementing them because no work had been done to make the concepts operational. To address this question properly requires a sophisticated expansion of the quantitative approach of Lord Keynes. It requires, first, the quantification — the measurement — of risk, and, second, the establishment of a relationship between that risk and the required rates of return.

Economists have attempted to solve these problems, although most attempts have been of recent origin. First, this work was hindered by the slow development of the necessary statistical tools. But even after those tools were developed, further work had to await the general availability of large amounts of statistical data that are necesssary to establish the propositions involved in probability and risk analyses. For example, one of the first of the recent studies was a test by Professor Stigler which, despite some imaginative attempts to extract information from inadequate data, could not get statistically significant results.

Good data first became available for financial markets. In 1959, Lawrence Fisher explained interest rate differentials on corporate bonds by risk variables, thus measuring the extra rate of return asked by bond investors for investing in riskier companies.

Since 1960 the tools and available data have increased greatly. Researchers have had access to a large body of industrial statistical data from which they can derive significant results. Dr. Fred Arditti of the RAND Corporation, Professor Shannon Pratt of Indiana University, the author and Gordon Conrad of M.I.T. and Arthur D. Little, Inc., Professors Holland and Cootner of M.I.T., and Drs. Irving Fisher and George Hall of RAND, among others, have all completed major quantitative investigations into the question.

One of the surprises of these investigations (at least it may surprise those who feel that economists always disagree with each other) is that all economists reach agreement on the broad outline of their results. The rate of return does rise as risk increases, and even the quantitative relationships show only minor differences. There are few settled empirical truths in economics; consequently, differences will arise and refinements will be made as work is reviewed. Nevertheless, the competition is no longer between different beliefs or feelings, but between competing hypotheses and empirical tests.

Figure 3 reveals the economy's risk/return pattern found in one of the studies referred to above. The figure presents a 16-year (1950-1965), 59-industry regression line for the relation between risk and return. As economic theory predicts, higher returns were indeed associated with higher risks. The deviation and implications of the figure are discussed in the previously cited *Harvard Business Review* article.¹⁸

The distribution of profit rates between industries and companies provides another view of the economy. Figure 4 presents the distribution of the average rates of return for the 59 industries used in Figure 3. The unweighted average rate of return equals 10.8 percent with a standard deviation of 3 percent.

Based on a separate study, Figure 5 presents the distribution of 118 Standard and Poor's industries' 1955-1967 average rates of return. Table 1 indicates the yearly average rates of return for the industries presented in Figure 5. (It will be noted that the number of companies and industries covered varies each year. This is a consequence of insignificant changes in industrial definition and reporting on the COMPUSTAT tape.)

Based on still another study concerning the American economy, Table 2 presents the latest available annual (1966-1976) rates of return for all industries reported in the FTC/SEC Quarterly Financial Reports.

Finally, Figure 6 presents the distribution of 1133 individual company average rates of return for the 1960-1969 period.

^{25.} Conrad and Plotkin, op cit, at footnote 22.



.



FIGURE 4 AVERAGE AFTER-TAX RATES OF RETURN ON TOTAL CAPITAL DISTRIBUTION OF 59 INDUSTRIES 1950-1965

.



Exhibit IV, p. 96.





Source: Developed from Standard and Poor's COMPUSTAT Annual Industrial Tape, see Table 1.

TABLE 1

ANNUAL AFTER-TAX RATES OF RETURN ON TOTAL CAPITAL STANDARD AND POOR'S INDUSTRIES 1955-1967

.

	Rate of	Number of	Number of
Year	Return	Companies	Industries
1955	12.3%	657	113
1956	11.4	680	114
1957	10.7	701	115
1958	8.8	724	115
1959	9.9	734	115
1960	9.3	752	115
1961	9.0	760	115
1962	9.6	771	115
1963	10.1 [.]	783	115
1964	10.8	784	115
1965	11.2	797	116
1966	11.2	793	118
1967	10.0	774	118
Average			
(1955-1967)	10.3%		

Source: Developed from Standard and Poor's COMPUSTAT Annual Industrial Tape. Each year's calculation includes all companies reporting the necessary data for that year.

1

TABLE 2

ANNUAL AFTER-TAX RATES OF RETURN ON TOTAL CAPITAL FTC/SEC COMPANIES 1966-1976

Year	Rate of Return*
1966	11.52%
1967	10.06
1968	10.22
1969	9.75
1970	8.65
1971	8.86
1972	9.48
1973	11.10
1974	12.60
1975	10.08
1976	11.95
1973-1976	11.43
1966-1976	10.38

*Rate of return on total capital defined as net income after tax plus interest, divided by net worth plus debt. Interest calculated assuming embedded debt costs of 5% for 1966-1969 and 7% for 1970-1976.

Source: Developed from Federal Trade Commission/Securities and Exchange Commission. Quarterly Financial Reports.

۱





Source: Developed for the U.S. Department of Justice from COMPUSTAT data.

-230-

These several exhibits are presented to indicate that while rates of return for individual years may vary, and while the dispersion of company returns is greater than that of industry returns, the long-term average rate of return is not much affected by the precise period chosen. The basic pattern of macroeconomic average rates of return changes very slowly over time.

3. Stone and Beta Theory

Much attention has been focused recently on former Massachusetts Insurance Commissioner Stone's use of the Capital Asset Pricing Model, or Beta theory, to determine an appropriate total rate of return target (and hence underwriting profit allowance) for automobile insurance companies. In his latter decisions Commissioner Stone agreed with his expert witnesses who opined that according to Beta theory, the automobile insurance activity is essentially riskless or, perhaps, possesses negative risk. These experts recommended as appropriate target total rates of return on insurers' net worth equal to the yield on Treasury Bills — 7 1/2 percent or less. These target values led to the establishment of negative allowances for underwriting "profit."

A discussion of the severe theoretical and practical problems entailed in using the Beta theory approach for establishing appropriate rate of return criteria on the book value of an insurer's net worth or total capital is beyond the scope of this paper. However, it is important to note that, contrary to assertions which have been made, the Massachusetts Supreme Judicial Court did *not* approve of the use of Beta theory to measure insurers' risk. Rather, the Justices illustrated that, despite their erudition, they were confused by the vocabulary of modern financial economics.

Beta theory, by its fundamental nature, considers only "systematic risk" (in practice measured by the correlation between a corporation's market value, the market price of its common stock, and a broad market index) and disregards all other aspects of a corporation's total risk. (The Capital Asset Pricing Model holds that no other risks require any reward. See Arthur E. Gooding's just-published article "Perceived Risk and Capital Asset Pricing," *The Journal of Finance*, December 1978, for a discussion of Beta and alternative views of investment risk.) However, the Court, while relying on a Beta theory risk measure, clearly indicated it required (and believed Beta produced) a measure of total risk, such as the ones discussed in the previous subsection. In its August 1976 Decision, the Massachusetts Supreme Judicial Court reviewed in great detail Commissioner Stone's November 17, 1975 auto bodily-injury and his December 30, 1975 property-damage rate decisions. The Court rejected Stone's basis for evaluating risk and establishing target rates of return for automobile insurers. The Court declared:

"The Commissioner's reasoning is open to question. ... And the Commissioner's approach seems suspect because it fails to confront and to consider all elements of risk of an Investment in such an insurer. Among these elements is the risk inherent in the line of insurance itself; some lines will have greater unpredictability and fluctuations of losses than others (footnote deleted) and an investor in a company which wrote such lines would demand a greater expected return than he would in a company in which the return was more certain. ... Finally there is risk to the Investor associated with the ratio which the insurer adopts between premium volume and capital: if the insurer maintains a high ratio, then adverse loss or expense experience will consume a greater proportion of the capital than it will in the case of an insurer with a low ratio; conversely, favorable experience would result in greater return to capital than in a low-ratio insurer. ... Hence, other things being equal, the high-ratio insurer is more risky than a low-ratio insurer and the reasonable investor would demand a greater average return from it than from the lowratio insurer. An assessment of these risks, and perhaps others, that characterize the model insurer and a comparison with the risk-return relationship of unregulated enterprises may be thought necessary if the target return of the model insurer is to be properly determined [footnote deleted]."26

Even though the Court was clearly displeased with Commissioner Stone's "weakly supported" approach to assessing the risk and establishing an appropriate return, it did not require a "remand to find an appropriate target rate of return," because the Court mistakenly believed that there was adequate evidence in the record which considered "all the elements of risk of an investment in [Commissioner Stone's model] insurer." The Court relied on the fact that the target total rate of return selected by Commissioner Stone was similar to the

^{28.} Attorney General vs. Commission of Insurance, Mass. Adv. Sh. 2068 (1976) at 2099-2100

one suggested by two Beta theory experts. The Court incorrectly described the approach of the Beta theory experts as follows:

"In setting the target rate of return the experts would advocate that *all aspects of the risk of the model insurer* be considered together (in setting the so called 'Beta' factor), rather than by the serial process described here. The final results would be expected to be identical."²⁷

Considering their lack of training in modern financial economics and the complete lack of clarity of the record and Commissioner Stone's decision on this point, it is understandable that the Justices committed the fatal error of assuming that the Beta risk measurement considers "all aspects of the risk of the model insurer." The hallmark of the Beta concept is total reliance on only the very limited systematic risk aspect. It was the opinion of Commissioner Stone's Beta theory experts that insurers' underwriting activities contain no systematic risk; hence, their assignment of a Beta approximating zero.²⁸

4. A Caution

To be sure, evaluation of risk — regardless of methods used — cannot be undertaken with absolute mathematical precision. The Important point, however, may be stated with considerable certainty: industries with roughly comparable degrees of risk must be allowed generally equivalent rates of return by regulatory bodies in order to assure confidence in the financial integrity of the enterprise. Further, the results of any risk measurement exercise must be subjected to common sense and marketplace evaluation if utter folly is to be avoided.

²⁷ Ibid , at 2104 note 37 (emphasis added)

^{28.} The careful reader of Commissioner Stone's decisions and the Court's Ophion will uncover an interesting sequence of "economic reasoning." In his initial decisions, Commissioner Stone did not rely on the testimony of those witnesses who utilized Beta theory to reach their recommendation for an appropriate total rate of return target He did, however, commit a gross error when he established as the appropriate rate of return on insurer's *rate worth*, the rate of return achieved by the broad spectrum of American industry on its *total capital*. The Court pointed out the obvious impropristy of this approach (see footnote 43, *un*/n, and accompanying text), yet as noted above, did not order a remand based on its own reading of the testimony. However, given the Court's explicit statements, it is obvious (to any economists) that the Justices did not underatand (or approve of the specific definition of risk employed by the Beta theorists in his subsequent decisions. Commissioner Stone wholeheartedly adopted the "Court sanctioned" Beta theory with never a commant on the fundamental inconsistency between the basic precepts of that theory and the view of risk clearly enunciated by the didamental inconsistency between the basic precepts of that theory and the view of risk clearly enunciated by the distices.

In his automobile rate-making decisions, Commissioner Stone claimed originality in "cutting the Gordian knot" of the insurance profitability question. It might be appropriate to note that with respect to regulating insurance profitability, Commissioner Stone's work was, in fact, good and original. However, it tacked a certain coincidence: that which was good was not original, and that which was original was not good.

IV. THE APPROPRIATE RATE OF RETURN YARDSTICK FOR INTERCOMPANY AND INTERINDUSTRY COMPARISONS

A. THEORY AND PRACTICE

Although propagandists may make much ado about the absolute dollar level of an industry's sales or profits, responsible observers realize that questions of "big or small," "excessive or non-excessive" can be answered only within a comparative framework. Thus, any profitability analysis has to specify an asset base against which the profits of each industry or company should be scaled and compared with those of other industries or companies. Two bases immediately suggest themselves: the total capital held by the firm and the net worth of (or stockholders' investment in) the firm.²⁹ Of course, returns on net worth.in one company or industry must not be compared to returns on total capital in another; one or the other asset base must be adopted for both in any single comparison.

Neither of the two asset bases — total capital or net worth — is ideal for all purposes; each has its advantages and disadvantages. However, economists and businessmen have found that return on total capital is better suited for understanding investment decisions and for comparing profitability among firms or industries.

Use of return on total capital has the advantage of minimizing differences in profitability among industries and companies that are due to different debt/equity ratios or financing mix. The insurance rate-review process is interested primarily in the basic earning power and uncertainty of asset investments, in required total rates of return, and not in the effects of capital structure on enterprises. In a study involving similar public policy concerns, we have stated the basic reasons for the use of total capital rates of return as follows:

"1. Society's view of optimal resource allocation — If physical resources are applied to a worthless venture or overapplied to a marginal one, society is the loser no matter how these resources were financed. The basic question is whether any resources are earning returns not commensurate with the economic risks at

^{29.} Net worth is defined as the sum of common and preferred equity, while total capital equals net worth plue long-term debt and debt (as opposed to seasonal trade credit) in current liabilities. Debt as used herein need not be interest bearing. See footnote 21 of main text, *nupra*

which they are placed. Should this be the case, it is clear that overall welfare would be improved by a reallocation of resources. This result is independent of the financing mix.

- "2. Underlying source of risk It is not suggested that management disregard trying to optimize its debt/equity ratio (a task which Modigliani/Miller say is impossible). Instead, it is suggested that in evaluating the 'underlying cause of financial as well as operating risks — which is the nonpredictability of earnings flow — management should concentrate on total investment and total earnings. Financial, or leverage, risk arises due to this underlying uncertainty.
- "3. Marginal investment decisions As has been shown adequately many times, the only proper criterion for making marginal investment decisions is the effect of the investment on the total risk and return position of the company. Marginal decisions do not become profitable if financed one way and unprofitable if financed another way, except in a most myopic sense."³⁰

As an illustration of these reasons, consider a steel mill. Its assets consist of bricks and steel. Should it be destroyed, the company and society would be less rich by the amount of assets that comprise the mill or the steel that would have been produced by the mill. No matter how these assets were financed whether by bonds or by a lease or by common stock — the loss to the company or the economy would be equally great. Theoretical and empirical investigations of this basic economic postulate have been numerous.³¹

Previous studies of comparative profitability have also favored the return on total capital approach. The classic study of corporate profits conducted for the National Bureau of Economics Research by Professor W.A. Paton of the University of Michigan is a good example. In this study Professor Paton first had to decide how to scale the dollar profits of the various corporations he

³⁰ Plotkin, Irving H. "Rates of Return In the Property and Liability Insurance Industry: A Comparative Analysis," Journal of Rusk and Insurance, June 1969, pp 180-81.

^{31.} Notably the following

Modigliani, F and M Miller, "The Cost of Capital, Corporation Finance, and the Theory of Investment," American Economic Review, June 1958, pp. 261-97, corrected for the corporate income tax case in Modigliani, F and M. Miller, "Corporate Income Taxes and the Cost of Capital A Correction," *Ibid* June 1963, pp. 433-43.

Miller, M and F Modigliani, "Some Estimates of the Cost of Capital to the Electric Utility Industry, 1954-57," Ibid , June 1966, pp 1267-77

Gordon, M. J., "Some Estimates of the Cost of Capital to the Electric Utility Industry, 1954-57. Comment," Ibid , December 1967, pp. 1267-77.

Brigham, E. F. and M. J. Gordon, "Leverage, Divided Policy, and the Cost of Capital," Journal of Finance, March 1968, pp. 85-103

Miller, M. and F. Modigtiani, "Some Estimates of the Cost of Capital to the Electric Utility Industry 1945-57 Reply," American Economic Review, December 1967, pp. 1288-1300

would consider. In Chapter II ("Earning Power from the Standpoint of Total Capital") of his book, Professor Paton states:

"Of the various possible measures of earning power, that which expresses income from the standpoint of the entire capital of the business, regardless of the form of capitalization, is doubtless the most significant, particularly when comparisons among individual enterprises and between special groups or fields are desired. It is the rate of return realized on all the capital committed to the undertaking, as opposed to the earning power of the stockholders' equity, that indicates the degree of success attending the activity of the concern as an operating unit."³²

In Chapter III ("Earning Power from the Standpoint of Stockholders"), he notes:

"A second important measure of earning power is the rate of profit realized to the total investment or equity of the stockholder. The profit rate is of course dependent upon the form of capitalization as well as upon the degree of operating success, and hence is in general less satisfactory than earning power in terms of all capital as a means of making comparisons between companies and periods."¹⁵

Professor Paton explains that he holds this position even though "rates realized on stock equities are the most common measure employed in financial circles" and "such rates are the convenient and usual mode of representing earnings."⁴⁴

Most practitioners of financial analysis, as well as professors of finance and economics, regard Security Analysis — Principles and Techniques, by Graham, Dodd, and Cottile, as the handbook of financial analysis. The text is parochial, In that it offers advice to investors seeking the profitable employment of *their* funds. Yet, when they discuss profitability ratios, the authors prefer to use total return on invested capital rather than return on net worth. They note:

"The best gauge of the success of an enterprise is the percentage earned on invested capital, i.e., on the long-term (non-current) debt and preferred stock plus the book value of the common stock. This percentage, or rate of return, is the ratio of total capital to the *final* net profit available for capital funds. Thus it reflects all recurrent items of profit and foss, including income tax, but not deducting interest on funded debt. The fundamental merit of return-on-invested-capital ratio is that it measures the *basic* or over-all performance of a business

Paton, W. A., Corporate Profits as Shown by Audit Reports, National Bureau of Economic Research, New York, 1931 p. 18.

^{33.} Ibid , p. 41.

^{34.} Ibid.

in terms of the total funds provided by all long-term investors — rather than a single class."36

The same view has been taken by economists charged with the formation and implementation of public policy. In attempting to study the relationship between industrial structure and company or industry profitability (a fundamental relation in antitrust theory and practice), James W. Meehan, Jr. (Assistant to the Director, Bureau of Economics, Federal Trade Commission) and Thomas D. Duchesneau (Professor of Economics serving on leave to the Bureau of Economics, Federal Trade Commission) explicitly rejected the use of returns on net worth:

"As noted, we have chosen to define the profit rate as the ratio of net income after taxes plus interest payments on long-term debt to owner's equity plus long-term debt. As defined, our profit rate is comparable to Stigler's profit measure. By including long-term debt, our profit rate adjusts for leverage differences in the capital structure among firms. Without such an adjustment, the equity-based profit rate for a firm with a high debt to equity ratio would be distorted relative to the profit rate of a firm with a low debt to equity ratio. In order to conduct a structure-performance test, we believe that it is necessary to adjust profit rates for leverage differences.¹⁴

"(14. Professor Richard Miller found a high correlation (.947) between the rate of return on equity and the rate of return on total assets. This high correlation indicates that our results would probably not have been significantly affected, if we used a rate of return on equity as our measure of profitability. See Miller, Richard A., 'Marginal Concentration Ratios and Industrial Profit Rates: Some Empirical Results of Oligopoly Behavior,' *The Southern Economic Journal* (October 1967, p. 261)."¹⁵⁶

None of the above is meant to suggest that businessmen do or should ignore the important influence of capital structure (debt/equity ratio) on needed rates of return on total capital and on net worth. While scholars still argue about the concepts of optimal capital structure, there is little disagreement concerning the risk influence of high debt/equity ratios on both bondholders and stockholders. For example, Professor Robert W. Johnson notes when discussing the literature:

"A common ground is the recognition that additional amounts of debt raise both the explicit cost of debt, as the risk to bondholders rises,

³⁵ Graham, B., D. Dodd, and S. Cottle, Security Analysis — Principles and Techniques, McGraw Hill, New York, 1982, pp. 231-34

³⁸ Meehan, J W and T D Duchesneau, "The Critical Level of Concentration An Empirical Analysis," The Journal of Industrial Economics, forthcoming See footnote 21 of main text, supra, for a discussion of Stigler's profit measure.

and the implicit (common stock) cost, as the risk and variability of earnings for common stockholders increase."37

The effect of financial leverage risks on rates of return needed to attract and retain risk capital becomes most severe when the debt/equity ratio exceeds 40 percent under conditions of regulated or nonregulated competition. Regulated monopolies can experience somewhat greater debt/equity ratios without the same adverse consequences.

The above considerations have had an effect on the thinking and actions of regulators of competitive industries (e.g., Insurance and transportation) as well as on antitrust policy. Rate regulation in competitive industries is more difficult than in monopoly utility situations. Competitive industries present to a given market various technologies and differing attitudes of managers and investors toward financial risk taking. The regulator, however, must be concerned with the availability, quality, and price of a product generally viewed as completely substitutable if not homogeneous. While considerations of individual company financial structure play an important role in determining the quality of products - especially those of financial intermediaries such as insurance companies and banks - financial structure does not influence the level of business risk inherent in the organization. Accordingly, regulators of competitive industries have paid explicit attention to leverage ratios in controlling the riskiness of individual firms. However, in order to avoid confounding the inherent business risks and returns of the industry with the managementdetermined financial risks produced by leverage in the capital structure, regulators of competitive industries must rely and generally have relied on total capital risk/return measurements rather than on partial or leveraged capital measurements.

B. LONG-TERM DEBT IN INSURANCE COMPANIES

For the title as well as the property and liability insurance industry, the two main reserve accounts, loss and loss expense reserves and unearned premium reserves, are the equivalent of the long-term debt found in industrial corporation balance sheets. As is true of most financial intermediaries, the insurance industry may not use the normal debt instruments of industrial bonds. Similarly, commercial banks generally are prohibited from borrowing by issuing conventional bonds. This, however, should not be misinterpreted as meaning that the total permanently employed assets in either operation — banking or insurance — or in any of the similarly restricted financial intermediaries are financed solely from equity capital.

On the contrary, insurance policies are examples of conditional promises to pay (debts) and demand deposits are examples of unconditional promises to

³⁷ Johnson, Robert W., "An Integration of Cost of Capital Theories," in Weston J. F. and D.H. Woods, Theory of Business and Finance — Advanced Readings, Wadsworth Publishing Co., Inc., Belmont, California, 1987, p. 300.

repay persons who in essence provide debt capital. The capital they provide contributes to the iong-term permanently investable funds in the operations of these financial intermediaries. From society's point of view, there is an opportunity cost for the monies being channeled into the insurance industry through the purchase of insurance policies, as there is an opportunity cost for the monies channeled into the banking and other nonbank financial intermediaries. The opportunity cost represents the earnings that could have been realized if the funds had been employed in some alternative activity. The wisdom of the actual employment is then gauged by comparing the actual earnings with the potential earnings of the same resources in the other possible use. An evaluation of the overall efficiency of capital employment requires one to view the total permanently invested funds in any of the industries compared. It is for these reasons that the two major reserve accounts must be included as sources of permanently invested funds in the insurance enterprise.

By comparing them with debt money suppliers, we do not mean to imply that insurance policyholders or bank depositors are making conscious investments in those operations. Instead it is suggested that, in effect, their purchasing of the insurance product or the banking product channels investable funds into the respective industries. Clearly, it would be inappropriate to compare the rates of return on merely the equity portion of the insurance or banking industry with the rates of return on the total capitalization of other industries. Because policyholders do supply funds to insurance companies and because the companies do earn investment profits on both these funds and on surplus funds, it is incorrect to exclude these reserve accounts when measuring the insurance companies' rates of return on invested funds.

As we have shown, premiums and reserves for insurance companies are analogous to deposits and deposit liabilities for commercial banks. The banking industry has been subject to much more discussion and research into the efficiency of its asset employment than has the insurance industry. Throughout the regulatory and academic discussions of banking, the measurements of the aconomic efficiency of the banking industry include ratios of the rate of return to total assets, which are, of course, equivalent to the sum of net worth plus deposits.

Working on behalf of the Federal Reserve Bank of Kansas City, the noted financial economist Dr. Lyle E. Gramley studied the economic efficiency of Tenth District member banks in the period 1956-1959. The purpose of his study was to guide banking regulators in making decisions in the public interest. In his landmark work, Gramley assesses the efficiency of the Tenth District member banks by measuring "the effect of size on ratios of net current earnings to assets."³⁹ Clearly, Dr. Gramley believes that from a social-economic standpoint

^{38.} Gramley, Lyle E , Scale Economies in Banking, Federal Reserve Bank of Kansas City, 1962, p. 37

the efficiency of the banking industry must be measured by the yardstick of rate of return to total assets. In other words, he feels that a meaningful measurement of return must be based not only on net worth, but also on bank deposits.

Each year the Federal Deposit Insurance Corporation (FDIC) publishes, in a statistical supplement to its Annual Report, the banking industry's rates of return on total assets as well as on net worth. We may infer from the inclusion of both statistics that neither is sufficient and that both are important to the agency established by Congress to ensure the efficient and safe operation of the American banking system.

The fact that these statistics are collected and published by the FDIC and are employed by both scholars and regulators demonstrates the importance of rates of return based on total assets. Likewise, reserves ought not to be excluded from calculations of returns for the insurance industry.

Direct support for the treatment of reserves as capital comes from Professor J. Robert Ferrari. In a paper presented before the Casualty Actuariat Society, Professor Ferrari comments on the treatment of reserves in the 1967 ADL Report** saying, "It can be argued sensibly that an insurance company operates with a levered capital structure. The leverage, however, does not result from the use of debt capital, but, instead, is an 'insurance leverage' resulting from the deferred nature of insurance liabilities."**⁰ He further supports this position by noting that insurance reserves should be viewed as "reserve capital,' that is, the amount of total investable assets that has been supplied by other than the owners."*¹

The same position has been taken by insurance regulators. In setting forth its official conclusions following an intensive Investigation of and hearing into investment income and insurance rate-making, the Texas State Board of Insurance concluded that insurance profitability should be measured on a total assets base:

"Total Assets is an appropriate rate base for the 'total income from all sources' approach in the establishment of rates since Assets equal Liabilities plus Net Worth . . .

It is appropriate to relate Total Income to Total Assets, used and useful, in the casualty and property insurance business because such Total Assets include (1) Net Worth, the stockholders' equity and (2) Liabilities, over 90% of which are loss, unearned premium and other policyholder premium related liabilities. Especially in Texas

Piotkin, Irving H., et al., Prices and Profits in the Property and Liability Insurance Industry, Arthur D. Little, Inc., Cambridge, Mass., 1987

⁴⁰ Ferreri, J. Robert, "The Relationship of Underwriting, Investment, Leverage, and Exposure to Total Return on Owners' Equity," Proceedings of the Casualty Actuarial Society, 1968, p. 269

⁴¹ Ibid

where Board approved automobile insurance rates are for all types of insurers, stock, mutual and reciprocal (excluding county mutuals), we should not confine consideration to stockholders' equity, only."⁴²

Target returns to total assets have been used by the Texas regulators in setting rates since that determination.

In a similar manner, Massachusetts Insurance Commissioner Stone held that total capital, rather than net worth, is the appropriate basis for rate of return regulation. However, the Massachusetts Supreme Judicial Court corrected an error in Commissioner Stone's logic when he assumed that because of the "formal capital structure" insurance companies do not issue debt. The Court held that reserves play the same role as debt securities in industrial corporations:

"Returning to the Commissioner's justification for setting the target rate equal to the average return on capital, we acknowledge the correctness of his observation that the return on equity should not ordinarily be equal for firms that differ only in their capital structure. Because of the first claim of debt to income, the risk of an equity investment in a firm with both debt and equity in its capital structure is greater than the risk of an investment in a firm without debt. Thus, because of the difference in risk, the expected return must differ. The possible difficulty with his justification lies in his apparent assumption that the formal capital structure of an insurer largely controls its risk vis-à-vis the corporate average. Although, as the Commissioner notes, insurers seldom issue debt - an obligation to repay borrowed funds would conflict with the role of capital as a guaranty fund in an insurance company (see In re Application of Ins. Rating Bd., 63 N.J. 413, 415-416 [1973]) - an investment in an insurer can be subject to varying amounts of risk, as the text indicates. Indeed, because of the first claim of policyholders to money, it would seem that the premium volume to capital relationship in an insurer has an effect on the risk of an equity investment comparable to that of the debt to equity relationship in an ordinary corporation."43

⁴² Texas State Board of Insurance, Order No. 15309, Exhibit H. November 18, 1970

^{43.} Attorney General vs. Commissioner of Insurance, Mass. Adv. Sh. 2068 (1976) at 2100 note 32.

D. IMPUTED INTEREST

In a 1969 paper presented to the Casualty Actuarial Society, R.A. Bailey claimed to have detected a weakness in the use of rate of return on total capital for property and liability insurers." He claimed that insurers reduced the price of insurance from what it ought to be in anticipation of investment income to be earned by them from investing the unearned premium and loss reserves. Mr. Balley believed that there may be what economists call imputed interest in the insurance product; however, he admitted he was unable to measure or even guess at the quantity of such imputed interest. Contrary to his assertion, the possible presence of imputed interest does not constitute an impediment to the use of the total capital rate base for regulatory purposes.

As discussed herein, insurers' rates of return are measured and compared with those earned in other industries in order to determine whether the insurance price or underwriting profit allowance is higher or lower than appropriate. The alleged possibility of imputed interest, of course, presents no problem in establishing prospective rates or prospective rate-of-return targets. With respect to retrospective analyses, even if imputed interest were present, it does not affect a regulator's ability to determine whether a rate level has produced excessive profits, for any profitability which is in Mr. Balley's sense "lacking from the computation" has already gone to benefit the policyholder in the form of reduced rates. Accordingly, for retrospective analyses Mr. Balley may look at the comparison as though one were asking whether, given the actually achieved return on total capital, could rates have been "even lower."⁴⁶

As stated at the outset of this section, net worth rates of return (where net worth is properly defined to be equivalent to the economicgoing concern value of the corporation, a concept which is *not* uniformly approximated by GAAP across the several industries)⁴⁶ may

⁴⁴ Balley, Robert A., "A Review of the Little Report on Rates of Return in the Property and Liability insurance industry," *Proceedings of the Casualty Actuanal Society*, Volume LVI, 1969, pp. 133-140.

^{45.} These points are discussed in great detail in my reply to Mr Balley's paper, *ibid*, pp 141-154, and in a subsequent paper. Plotkin, Irving H., "Profitability in insurance Pricing — A Rejoinder to Balley, Goddard, Ferrari and Norgaard," presented at the May 1970 meeting of the Casuality Actuarial Society but not reproduced in its *Proceedings* Because that unpublished paper contained the first mathematical proof of the necessary and sufficient conditions for the economic viability of an insurer's operating profit margin (and hence its underwriting profit margin), the paper is reproduced as an appendix to this presentation.

^{46.} In that regard, GAAP net worth significantly and disproportionately understates the economic goingconcern value of insurance companies, owing to its treatment of deferred contingent tax itabilities – accounts which generally are not material for non-insurance enterprises For en extended discussion of this issue see Plotkin, Irving H, "Measuring Insurance industry Profitability" A Problem in Economics, Not an Exercise in Accounting," 1972 Proceedings of the NAIC, Volume 1, pp. 422-425.

provide useful regulatory guidance. If one rejects the return on total capital, net worth is the only alternative. However, at a minimum, any analysis of return on net worth requires a simultaneous explicit analysis of both operating risk and financial leverage risk. The insurance industry is more highly leveraged than most any American industry, i.e., its ratio of borrowings to net worth is exceedingly high. As the Massachusetts Supreme Judicial Court Instructed Commissioner Stone, this produces a substantial risk for Investors in insurance companies, requiring explicit evaluation if insurers' rates of return on net worth are to be compared with net worth rates of return realized by other industries operating with very much lower degrees of leverage. In addition, the value of net worth must be adjusted to include the present discounted value (generally effectively 100%) of the deferred tax accounts which are excluded from the GAAP calculation. These complications do not arise when using the total capital approach.

E. NAIC PROFITABILITY STATISTICS

There is a wonderful story told about a French Cardinal who was sitting in his drawing room entertaining his friends when he heard the people of Parls marching in front of his window on their way to storm the Bastille. He turned to his guests and announced, "There go my people. I must run and lead them." In 1970 the NAIC Central Office started to publish profitability statistics for the property/llability insurance industry. Perhaps to make up for lost time, the NAIC now publishes and sells not only total rate of return statistics but also operating profit margins by-line and by-state and even claims to produce operating profit margin by-line, by-state, by-company. There are a number of theoretical and practical infirmities in the NAIC data, only some of which will be indicated here.

The NAIC's overall (country-wide, all lines combined) profitability reports suffer from an incorrect and downward biased definition of net worth compared to the economic-going concern value of insurance companies." In addition, for the last two years the NAIC has employed a definition of "mean" assets and "mean" net worth which is equivalent to the initial rather than the average value of these quantities. This definition has been defended on "actuarial" grounds. It is clear, however, that periodic government reports of corporate rates of return, such as the profitability measures in the SEC/FTC annual and quar-

^{47.} See footnote 46 and accompanying text, supra.

terly reports, use average or end-of-year values.⁴⁴ These two infirmities produce a significant upward bias in the NAIC's total rates of return values.

The NAIC by-line, by-state operating profit margins are recognized to contain significant measurement errors, rendering them possibly useless even as long-term averages and definitely without instructive value for individual years. The NAIC's latest publishing venture, by-line, by-state, by-company operating profit margins, in most cases contains essentially random numbers and is incapable of yielding guidance to regulators or scholars.

^{48.} In its reports of annual corporate profitability, the Foderal Trade Commission/Securities and Exchange Commission use the mean, or average of initial and ending book values, as the appropriate denominator in the rate-of-return formula: "The rates of return in this report were computed on the average of the investment at the beginning and end of each year." Owing to the pressures of time, in the Quarterly Funccial Reports, the value "at the end of the quarter" is used accompanied by the following applogy: "Ideally, stockholders' equily should be represented by the average of stockholders' equily at the end of the quarter and at the end of the preceding quarter; such calculations, however, would deally issuance of the published report more than the difference would justify".

After being presented with this and other economic evidence concerning the impropriety of using initial values in its profitability calculations, the NAIC (A-3) Technical Subcommittee unanimously recommended that the everage of beginning and ending values be used in the NAIC profitability reports. However, Messrs. R.A. Balley (of the NAIC Central Office) and J.D. Montgomery (of the Califormia insurance Department) defand the continued use of initial value for the "mean" value, arguing: (1) the faderal government (i.e., the economists at the FTC and SEC) should not tell the states what to do, and (2) the current NAIC approach and nomenclature are correct because a similar calculation is designated "mean" return in the life insurance statutory Annual Report

V. CONCLUSIONS

Now, ten years after the publication of the original Arthur D. Little report,⁴⁹ what can be said with certainty about the role of total rate of return in insurance rate review. While it is difficult for physical or social scientists to pronounce with certainty, it does seem that several theories have been generally discredited and are not likely to influence future rate-making practices. No longer will the propriety of insurers' profits be judged solely by reference to an arbitrary pre-tax underwriting profit margin. No longer will the investment earnings of an insurance company be isolated from its underwriting activities in considering its revenue needs.

It seems apparent that the concept of total rate of return currently is guiding insurance rate making and rate review in a manner consistent with the theories and principles which guided the 1967 Arthur D. Little study. While debate about definitions (net worth versus total capital; statutory versus GAAP versus economic going-concern; etc.) and methods for setting rate of return standards (total risk versus Beta theory) will continue, as they continue in many regulated industries, it is unlikely that the insurance industry or its regulators will ever again attempt to seek refuge in the 1921 NAIC profit formula or any measure restricted to underwriting profit margin.

As the unifying metric of the nation's capital market, the rate of return concept will also transcend the debates over prior approval versus open competition and over federal versus state regulation. Accordingly, as an economist I view as a healthy sign the efforts by this organization, the NAIC, the individual states, the insurance industry, and the Federal Trade Commission to review and refine the concept of total rate of return.

^{49.} Plotkin, up cit , at footnote 39.

APPENDIX

.

•

.

PROFITABILITY AND INSURANCE PRICING -- A REJOINDER

TO BAILEY, GODDARD, FERRARI AND NORGAARD

By Irving H. Piotkin Senior Economist Arthur D. Little, inc. Cambridge, Massachusetts

Presented at the 1970 Meeting of the Casualty Actuariai Society May 24-27, 1970

Arthur D Little, Inc.

I. INTRODUCTION

Thank you very much Mr. Chairman. It is again a distinct privilege to appear before your Society and discuss the topic of insurance profitability and pricing. I would first like to address the basic question raised in Mr. Bailey's two papers.¹ Next, I will turn to the three discussions of Mr. Bailey's paper.² Finally, by examining Professor Ferrari's 1968 paper,³ I would like to introduce my current insurance research topics.

^{*} Presented at the May 24-27, 1970 Meeting of the Casualty Actuarial Society, Hollywood, Florida.

¹ "A Review of the Little Report on Rates of Raturn in the Property and Liability Insurance Industry," Presented in November 1969 to the Casualty Actuarial Society Meetings in Atlanta, Georgia and "Author's Raply to Review by Irving H. Plotkin, "Presented at this Meeting.

² Discussions by Russell P. Goddard, J. Robert Ferrari, and Richard Norgaard and George Schick presented at this meeting.

³ "The Relationship of Underwriting Investment, Leverage, and Exposure to Total Return on Owners' Equity," <u>Proceeding of the Casualty Actuarial Society</u>, 1968, pp. 295-302.

11. THE BAILEY PAPERS

In both of his papers Mr. Bailey argues that in measuring insurance company profitability, ADL did not include "imputed interest" -- the amount of investment earnings on policyholder-supplied funds which Mr. Bailey claims is returned to policyholders in the form of lower prices and higher loss settlements. We agree. We included imputed interests for none of the industries in our studies. However, we responded to Mr. Bailey that even if the existence of imputed interest were generally accepted, its inclusion could piay no logical role in answering the questions to which our study was directed:

1) Are insurance prices currently high because insurance profitability is, in any sense, excessive?

and

 Do present levels of insurance industry profitability offer any reasonable hope of price relief?

Our answer, derived on numerous bases, has been clearly "No." Believing that part of the industry's profit already lowers prices, Mr. Bailey could view our analysis as answering the question, "Can present industry profitability offer <u>further</u> price relief?" imputed interest would play no role in answering <u>that</u> question. To the extent that investment earnings on policyholder-supplied funds are already returned to policyholders, it is absolutely impossible for those earnings to be used a second time to further lower prices. We have pointed this out to Mr. Bailey in our reply, yet he has failed to address the issue in his rejoinder.

-250-

Although his second paper tries to retract his original position, at least Professor Ferrari⁴ and I feel that Mr. Balley argued that return on net worth is the only legitimate basis on which to measure insurance profitability. However, even after my questioning him on the issue Mr. Balley does not clearly say in his reply paper how the industry compares on that basis -- Are its profits excessive? Do they offer the hope of lower prices? By alleging that ADL "substantially" understated returns, Mr. Balley appears to imply that he has a position but he falls to enunciate it. Thereby he gives neither management nor regulator any guide for action, but needlessly beclouds the true issue.

Now that Professor Norgaard has come out in support of Mr. Bailey's position, I must again ask whether he agrees with Norgaard and Schick that insurance companies have "reaped a high rate of profits over the last 15 years"⁵ and have rates of return "better than 90% of all U.S. companies."⁶ Norgaard, in his discussion of the Bailey paper, informs

6 Ibid.

⁴ In his discussion Professor Ferrari writes, "Bailey (in his paper) seems to have as the basic objective the development of a rationale for calculating return for property and liability insurance companies as net income/net worth. . ." and further, "While i tend to agree with Bailey's choice of a return measure, I have to admit that I did not find his arguments about imputed returns particularly convincing."

⁵ R.L. Norgaard and G. Schick, "Profitability in the Property and Liability insurance industry," a study submitted to the United States Senate, Subcommittee on Antitrust and Monopoly of the Committee on the Judiciary, July 9, 1968, summary page. See also Arthur D. Little, <u>Reply to Criticisms of the ADL Report</u>, Cambridge, Mass., August 1969.

us that he (Norgaard) and Bailey obtained the same value for the rate of roturn. Doos Mr. Bailey agroe with the comparison of their results expressed by Professor Norgaard? (It should be recalled that Professor Norgaard found the insurance Industry earning an average of 18\$ per year <u>on total assets.</u>)

-

III. THE DISCUSSANTS

Now let us consider the three discussants of Mr. Bailey's paper. While it may seem that their comments are as disparate as those of three blind men describing an elephant, they do have one element in common. Each discussant faults Mr. Bailey for not citing and using his (the discussant's) previous work. Besides that concern they can agree on nothing.

١

With respect to imputed interest Professor Norgaard begins his discussion by saying, "Bailey gives cogent, logical arguments why the ADL formula is wrong." While Professor Ferrari begins by saying, "I have to admit that I did not find his [Bailey's] arguments about imputed returns particularly convincing." Professor Ferrari also feels (as we do) that one can defend the use of return on net worth without "resorting to Bailey's rather subtle notions."

Discussing the other major point of the Bailey paper -- which rate of return measure to use -- Mr. Goddard announces that "the standard method of measuring the rate of return for the insurance industry is to relate the total earnings to net worth." Professor Norgaard claims that "the best known profit ratio" is based on total assets. In fact, the Norgaard-Schick analysis, which Norgaard claes, was itself based on return on total assets and concluded that such returns averaged 18% per year for the insurance industry. (In light of Professor Norgaard's preference for return on total assets and his use of total asset return without imputed interest in all his other work, I fail to see how on any logical basis he can support Mr. Balley's position -- but this is not the first time I fail to follow Professor Norgaard's logic.)

-253-

ADL has always agreed with the proposition that return on net worth is useful for the analysis of many problems in stock insurance companies -- especially those concerned with capital flows and insurance capacity. For instance, in the original 1967 ADL Report⁷ we stated "an individual investor is (rightfully) concerned with return on net worth." As we note in the next section of this paper we discussed returns to net worth and a basis for comparing these returns in our original study. In our reply to Mr. Bailey's original paper we argued in the same manner as later advanced by Professor Ferrari.

We said:

"While we cannot accept his justifications, we can accept and do appreciate Mr. Bailey's desire to use what he calls "the only realistic alternative," the return on net worth as a measure of comparable eernings between insurance companies and other industries. We feel the return on net worth measure is appropriate when discussing problems of insurance capacity and problems of stockholder-owned insurance companies. However, in relying exclusively on this measure, Mr. Bailey leaves unanswered questions concerning the measurement of return on mutual and other non-stock insurance enterprises, the social reasons for measuring the efficiency of the employment of equity-financed assets, and the effect of comparing industries with differing capital structures. How would the return to net worth measure be useful in these cases?"⁸

0

⁷ Prices and Profits in the Property and Liability Insurance Industry -- Report to the American Insurance Association, Arthur D. Little, Inc., November 1967.

⁸ Irving H. Plotkin, "Reply to Robert A. Bailey's 'A Review of the Little Report on Rates of Return in the Property and Liability Insurance industry," <u>Proceedings of the Casualty Actuarial Society, 1969</u>, vol. 56, p. 147.

Further, in our presentation to the Antitrust and Monopoly Subcommittee (to which we referred in our reply, but which was not considered in Mr. Balley's reply) we state:

"ADL does not blindly favor one rate of return over another. We believe one must specify the purpose of a measurement before specifying which yardstick he will use. When measuring total earnings from operations and investments in order to compare the efficiency of asset employment in one industry with the rest of the economy, the appropriate standard is, in our opinion, rate of return on total funds invested. We believe it is appropriate to use the return on net worth figure when considering just stock insurance companies and their problems of attracting capital to provide sufficient insurance capacity."⁹

In this latest study we presented data and an analytical framework in which to assess return on net worth. Based on this analysis

we stated:

"We note, however, that the conclusions of our study hold no matter which of the two bases of comparison is used. The insurance industry not only yields lower returns on total invested funds than any other industry or investment opportunity in the United States economy, but it also has one of the lowest rates of return on stockholder investment in the United States economy. Therefore, those who would argue at great length over which base is appropriate are advised to consider whether the argument in this case is merely academic. Our conclusions concerning the impracticality of looking for price relief by assigning to pollcyholders any excess in insurance industry profits stand no matter which base is used to measure rates of return and to judge reasonableness of profits."¹⁰

10 Ibid.

⁹ Irving H. Plotkin, "Profitability of the Property and Liability insurance industry," statement before the Subcommittee on Antitrust and Monopoly Legislation of the Committee on the Judiciary of the United States Senate, November 25, 1969, p. 26.

Before leaving the discussants, the pointedness of Mr. Goddard's remarks appear to require a reply. In the past when considering Mr. Goddard's writings I have felt that silence was as clear a reply as possible. In general, I think I shall perpetuate that procedure. However, for the interested reader I will merely note a few of Mr. Goddard's statements so that the reader may draw his own conclusions about Mr. Goddard's approach to research and scholarship.

Mr. Goddard states that "measuring the rates of return for the insurance business as a whole can be quite a hum-drum affair." He further states that profitability of the insurance business "is a fact, not a hypothesis," and then says, "the average profit from the insurance business can easily be determined from statistical reports by any actuary with a desk calculator and a few assumptions." One is only left to wonder whether one of those assumptions might possibly concern the enswer.

The depth of Mr. Goddard's knowledge about modern finance is evidenced in his statement that the insurance companies' tendency to put earnings into surplus instead of paying them out as dividends "had the effect of depressing the market price of their stock to less than book value and made them easy targets for takeovers." Should not the rate of earnings of these reinvested assets enter and perhaps dominate such a determination?

Finally, Mr. Goddard's familiarity with the concepts of national income and welfare economics are illustrated by his statement that "the idea of a numerical measure of [the value] of any product or service to society is an unusual one and . . . it should be easy

-256-

to demonstrate that it is unnecessary." Unusual to and unnecessary for -- Mr. Goddard perhaps?

IV. PROFESSOR FERRARI'S PAPER AND OUR CURRENT RESEARCH*

Having cleared away the chaff we may now turn to the kernel of enlightenment to which this discussion may have given rise. In his discussion of the Bailey paper, Professor Ferrari essentially summarizes an earlier paper of his¹¹ which discusses the 1967 ADL report. In his 1968 paper Professor Ferrari introduces the concept of insurance reserves providing financial leverage to an insurance company.¹²

In his paper Professor Ferrari agrees with the concept enunciated in 1967 by ADL that insurance reserves are, in his words, "'reserve capital,' that is, the amount of total Investable assets that has been supplied by other than the owners." Therefore, rather than agreeing with Mr. Balley, the original Ferrari paper argues in favor of treating reserves as the equivalent of debt capital in other industries. Ferrari, in fact, states, "It can be argued sensibly that an insurance company operates with a levered capital structure." (Hence, we may now understand why Mr. Bailey did not cite Ferrari's work.)

^{*} The fundamental contributions of Dr. Emilio Venezian to that research are gratefully acknowledged.

¹¹ "The Relationship of Underwriting investment Leverage and Exposure to Total Return to Owners' Equity," <u>Casualty Actuarial Society Pro-</u> <u>ceedings, 1968</u>, pp. 295-302.

¹² Ferrari credits one of his professors for introducing him to the concept of leverage in non-insurance enterprises. Had he continued to read the same paragraph of the 1967 ADL Report from which he quotes a sentence, he would have found the concept of leverage applied directly to an insurance enterprise. We, in fact, discuss the concept of a levered return and suggest bases for comparison of the insurance companies returns with other risk-equivalent returns. The omission of any reference to this discussion by both Balley and Ferrari is remarkable, to say the least.

Ferrari then divides (using his notation) T, total after tax return to the insurer, into two mutual exclusive and exhaustive components: I, investment gain or loss (after appropriate tax charges) and U, underwriting profit or loss (after appropriate tax charges). It is this unfortunate splitting of the insurance stockholders' total income stream that leads Ferrari to make a critical error when he discusses the economic viability of the insurance activity.

After defining these values and after some unnecessarily complicated algebra, Professor Ferrari reaches the conclusion that "it is to the benefit of the owners [of the insurance company] to continue to write insurance in the event of underwriting losses as long as ratio I/A exceeds the absolute value of a negative ratio U/R."

The validity of Professor Ferrari's important conclusion has two major limitations. The first limitation results from assumptions implicitly made in lumping together investment earnings on policyholder-supplied funds with investment earnings on stockholder-supplied funds. The second and more serious limitation arises because the investor's risk is completely ignored.

Let us segment Ferrari's I, investment earnings, into two components: I_P, investment earnings on policyholder-supplied funds and I_S, investment earnings on stockholder-supplied funds, such that:

$$I_p + I_q = I$$

Let us also define the concept of operating income, N_o, as the sum of underwriting income and investment earnings on policyholder-supplied/funds: funds:

 $N_0 = U + I_p$

Accordingly, the total return to the stockholder is given by:

$$T = (U + I_P) + I_S = N_0 + I_S$$

the overall rate of return to investor, r_{S} , can be decomposed into a return from operations, r_{o} , and a return from the investment of the investors' funds in a portfolio of assets, r_{1S} :

$$r_{s} = \frac{N_{o}}{s} + \frac{I_{s}}{s} = r_{o} + r_{ls}$$

as Ferrari's we use S to represent the value of stockholder-supplied funds (stockholders' equity).

In this manner we see that a <u>necessary</u> condition for the owners of the company to desire to write insurance is that net operating income, N_{o} , be greater than zero. That is:

 $N_{p} = U + I_{p} > 0$ (necessary)

Or equivalently,

It is easy to understand why $N_{o} > 0$ is a condition necessary to attract investor capital. Were investors to put their funds in any other activity, say a closed-end mutual fund, they would have an opportunity to earn a return on the funds they supply. If we assume that for the risk the insurance investor faces from the company's <u>investment</u> of his funds (that is, the portfolio risk and not the risks inherent in the insurance operation) he could earn a return not less than r_{1S} in any investment activity of similar risks, then he would not care to invest his funds in an insurance activity which reduced his overall return, r_{S} below r_{1S} , the return he could achieve

-260-

reduced his overall return, r_S, below r_{IS}, the return he could achieve by an alternative employment.

Ferrari's condition:

is equivalent to our condition:

only under a restrictive assumption. This assumption (never discussed by Ferrari) is that the return on the investment of stockholder-supplied funds (which we call r_{1S}) equals the return on the investment of policyholder-supplied funds (which we call r_{1P}). Because this assumption may not in general obtain (and much of the literature argues against its validity), <u>Ferrari's condition is not generally true</u>. However, the more direct, economic condition which we have used, r_{o} or N_{o} greater than zero, has broad generality as a necessary condition for the economic viability of the insurance activity. It also has the advantage of being more readily understood and having an almost selfevident economic interpretability. (As we show in our forthcoming work, it additionally illustrates the sterility of the "investment income argument.")

Ferrari's criterion, and the more general one we have independently developed, express only a necessary condition, they do not guarantee viability. Studying the sufficiency conditions for the economic viability of the insurance activity brings to light a second fundamental limitation in Professor Ferrari's approach and conclusion.

-261-

An investor placing his funds in an insurance company expects two sources of return. First, from the investment of his funds in a portfolio of assets yielding a return of r_{1S} and, second, a return from the operations of the insurance activity, r_0 . He fully realizes that each of these sources of return exposes his capital to an element of risk. The portfolio investment of the stockholders' funds brings with it a portfolio risk which we denote by $\sigma(r_{1S})$. However, exposing his funds to the vicissitudes of the insurance operation brings on an <u>additional</u> risk.¹³

If the Investor in insurance expects a risk higher than the investor holding a mutual fund whose risk is $\sigma(r_{iS})$, the former will require that the operating rate of return, r_o , be greater than some positive value:

this, of course, implies:

Beta (β) may be thought of as a risk premium which the insurance operations exceed.

To summarize, we find that it is important to segment the investment earnings, I, of an insurance company between those earnings on policyholder-supplied funds, I_p , and those on stockholder-supplied funds,

 $^{^{13}}$ Under very limited conditions involving the covariance of r_{1S} and r_{0} and the value of the underwriting ratio, the insurance activity may result in a total risk which is lower than $\sigma(r_{1S})$.

 I_S . Further, we find that the economic viability of the insurance enterprise is dependent on the positivity of operating income:

as a necessary condition; and generally dependent upon

$$r_{a} > \beta > 0$$
 (sufficient)

as a sufficient condition.

This rather sketchy presentation of our current research leaves out many important details, notably the discussions of the underlying assumptions and the effects of different underwriting ratios. Our studies will be published as a report¹⁴ to the insurance Rating Board and presented to the State of New Jersey insurance Commissioner. The report will discuss at greater length our investigations into necessary and sufficient conditions of satisfactory risk/return positions for insura ance companies. It will also consider the effects of varying the ratio of premiums written to stockholders' equity on the returns and risks to the stockholders and the costs and risks to the policyholder.

¹⁴ Studies on the Profitability, Industrial Structure, Finance, and Solvency of the Property and Liability Insurance Industry, Arthur D. Little, Inc., June 15, 1970.