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ASSET MANAGEMENT FOR AN INSURANCE COMPANY

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1. Once criteria for the effective use of capital are established, how is that effectiveness achieved?
2. What are the effects of purchases? Product design? Surplus objectives?
3. How important is flexibility in asset management?

MR. STANLEY B. TULIN: Most of us learned through the actuarial exams that life insurance companies invested in long-term bonds and mortgages because of the long-term nature of life insurance liabilities. When I started working in the life insurance industry, this was, of course, true. Permanent insurance was the dominant form of life insurance. Investment yields were stable, although few of us realized then that 1 to 3 point variations constituted stability, and cash flow was always positive. Policy loans were not a very serious problem because policy loan rates of interest were not substantially less than available external loan rates. There was considerable incentive for life companies to invest their funds in long-term debt because long-term interest rates were significantly (as much as 30% or 40%) higher than short-term rates. Competition, although certainly a factor, was not significant in the way it is today and there were large career-oriented agencies that actually produced all or virtually all of their business with their company. Actuaries did use interest assumptions in pricing their product, often as aggressive as 6 1/2%, which were graded to an actuarially responsible 4% or so. When an actuary priced an annuity it was to ascertain that amount which could be paid, monthly or less often, to someone who paid an initial single premium or a series of premiums.

Today a few things are different. First, there has been a dramatic shift in the mix of life insurance sales. Traditional whole life insurance has been replaced by term coverages. Buy term and invest the rest has become a life insurance industry product. Life insurance companies have experienced competition for the savings dollars both from within the life industry and also from without. Policy loans are becoming the largest single life company asset as external interest rates have risen to record levels making policy loan interest rates more attractive. Twisting and replacement have become common, if not generally accepted, in the life insurance industry. Finally, during the past two years we have experienced a new phenomenon, namely, the inverted yield curve. Going back to the good old times of 1970, who would have believed that some large eastern mutual life companies would be forced to borrow money to fund their policy loan and surrender demand; or that most of the life insurance industry could find itself bankrupt if a full cash in occurred, and it was forced to liquidate assets that now have market values 20 to 30 percent below the book values.

To add to the excitement of the 1980's, we find ourselves in a very competitive marketplace with innovative new products, priced using slim profit margins and heavily dependent on the ability of life company investment personnel to manage large amounts at small margins in a volatile environment. There are several general conclusions to all of this:

1. Our business has changed, probably permanently, and our investment and pricing philosophies have changed and will have to change more in order to survive the 1980's.
2. Life companies will have to involve the people responsible for pricing products in the investment side of the house.
3. Companies are beginning to consider, and sometimes reject as not acceptable, the magnitude of the investment risks some of today's products present.
4. New investment techniques, including hedging by appropriate participation in the interest futures market, will become common to our industry.
5. Obviously, the once-honored concept of long-term investment must give way to serial bonds, short-term securities, equity participations in real estate and other more innovative investments.
6. Cash flow projections will be ever more necessary and ever more sophisticated as investment departments learn to deal effectively with the problems presented.
7. A new breed of life insurance investment personnel is emerging.

As all of these changes take place, I also see other changes occurring.

First, companies are accepting the notion that different lines of business and different product types within a line of business have different asset needs. One need only consider two different products, the Guaranteed Investment Contract and the Single Premium Deferred Annuity, to appreciate the problem.

1. The Guaranteed Investment Contracts (GICS) are being offered in the group pension market today. These products have very high and sometimes very long-term guarantees. One corporate client of mine recently funded its retired benefits with a GIC offering 17 1/4% for 20 years. This client was actually curious as to how the insurance company could afford the guarantee. GICS, of course, do have market value adjustments on surrender and so the only requirement in terms of matching assets and liabilities is the ability to fund the interest guarantee over a twenty-year period. One mechanism that is common for such long-term high rate contracts today is real estate participation, usually with fixed contract financing, but with equity participation in addition.

2. A no-load, Single Premium Deferred Annuity (SPDA) is often sold today with short (one year or less) competitive guarantees. In addition, the surrender charges are based on duration and not on the market values of the underlying securities. When this product line blossomed in the mid-1970's, many companies invested long (over ten years). Today most companies active in this market are investing quite short and attempting to "match" the underlying investment term or maturity with the contract.

The two examples I have illustrated are easy to discuss and understand. If it were as easy to fix investment philosophy for all of the life products currently on the market as it is for these two, at least conceptually, then the 1980's would not be as much of a challenge as I think they are going to be.

Problems arise in the attempts to match assets and liabilities when market value adjustments are not available to the product design and when the guarantees are long. Consider, if you will, a company writing SPDA's with long guarantees. Assume it is in compliance with all state regulations and that, therefore, its surrender charges rapidly evaporate. The investment side must invest long in order to lock up a long-term rate, but then it is exposed to capital loss on surrender. Further, because the capital loss on surrender occurs when interest rates, and, therefore, investment alternatives to the insured, are higher at some point in the future, the problem is compounded because it is exactly at such times that surrenders will be high. How can a company protect itself from this risk and still issue SPDA's with long-term guarantees? It is in such instances that I see hedging in the interest futures market as a possibility. There are, of course, significant factors affecting our industry's ability to play in the futures market including the regulatory aspects. However, assuming we can resolve regulatory problems, to the extent that they exist, hedging can be important. There is a cost to hedging, of course, which is to say that a company's yield to maturity with perfect hedging will be less than its yield to maturity when exposed to the capital loss.

As the industry has moved to different investment philosophies for different products and different lines of business, I see the old days of a completely pooled general account disappearing. This has already started to happen. First, of course, some mutual companies have started to use the Investment Year Method for dividend distribution rates of interest. Next, some companies have stated as an investment policy that the group annuity or other yield-sensitive lines will have no participation in equity investments. The ultimate "split" of assets is, of course, separate companies (either legal entities or informally within a given legal entity) for investment purposes. This approach, which some people call "segmentation" is actively being considered by some companies. It has the advantage of clearly defining the assets associated with each product line and enhancing understanding within a company of the differing investment needs of various lines of business. However, it has several disadvantages. First, the amounts of money to be handled separately may be too small, except for large companies and large lines of business. This "size" problem could give rise to concentration of investment risk problems (i.e. default) as well as being burdensome to administer. Second, absolute segmentation is tailored to a clear-cut

delineation of assets as in the example of long-term GICS and short-term SPDAS. In fact, each line of business is likely to have some portion of its investments in a variety of asset types and maturities. It is really the portion of new funds to be invested in various assets which will and should vary from line to line. Consider the following example:

Investment Needs

	<u>Line 1</u>	<u>Line 2</u>	<u>Line 3</u>
Equity	1/3	1/10	0
Short-term Debt	1/3	1/10	9/10
Long-term Debt	1/3	8/10	1/10

Traditionally, investment departments invested funds more or less based on management's decisions about which investments made most sense from an investment point of view at a given time. In today's world, I see companies defining the investment needs with respect to new money by line of business or sub-line of business in this manner. Then, as new money rolls in, it can be summarized by product line and an investment philosophy can be set which is consistent with the guidelines. In my example, if the funds for a given period were expected to be equal by line, then the investment department would be instructed to put 14.4% of investments in equity, 44.4% in short-term debt and 41.2% in long-term debt. In addition, each line of business would have hedging rules based on the contract and investment characteristics of the line. The advantages of such a system, which we can call proportionate segmentation, include:

1. The investment personnel are not burdened with keeping assets separate for separate lines or sublines. They need only invest and hedge based on an underlying company philosophy.
2. Each line gets a broad share of all the new money placed in a particular asset class. This eliminates the concentration of risk problem.

Both proportionate segmentation and pure segmentation (which is really a special condition of proportionate segmentation) will require flexibility in the investment arena. I believe that forward commitment activity will be greatly reduced and the entire process will be much more dynamic than in the past.

There are, of course, other factors which will have to be considered in life company asset management. These include, but are certainly not limited to:

1. Federal and Other Taxes - The after-tax yield is really the important item. As changes in the tax law occur, special opportunities or special disadvantages may develop. One important question under the current tax law is how to handle companies which have group annuity business, on which they are getting an interest paid deduction and, thus, looking for the highest possible pre-tax yield, co-mingled with non-pension life reserves, where the Menge Paradox is beginning to suggest investments in equities or tax exempts. Under current tax law, the two lines cannot co-exist in the same company.

2. Concentration of Investment Risk - Except for the specific matching needs discussed already, companies will be moving to diversify the types of assets they acquire. This will include more real estate, not mortgages, but rather income as capital gain producing real estate; more serial and floating rate securities and, generally, more diversity of asset type.
3. Acquisitions - Life companies will find themselves, and are already finding themselves, as other entities' investments. Throughout the 1980's we will see more life companies acquired by other life companies, other financial institutions and by industrial concerns. Depending upon who is doing the acquiring, the asset management of a life company might change. As an example, consider the possible acquisition of a life company by a large manufacturing concern that plans to use the life company assets, at least indirectly, as a means for funding its own capital needs. This is happening now and will continue to happen. As it does, actuaries must be prepared to explain the important investment requirements of their business to people in another business with different ideas. Often, a good solution will be found to satisfy new outside ownership and still protect the life company. But we must be prepared.
4. With respect to acquisitions, many life companies are acquiring other life companies or other financial institutions. The acquirers must be careful to plan their cash needs along with the product needs of matching and the other diversification needs already discussed. Over-extension can become a problem. Of course, in evaluating other life companies for investment purposes, life company managements will have to evaluate the target company's own assets as they relate to the target company's product lines.

Indeed, things are different today than they were 15 years ago. The 1980's represent a new challenge to life companies and to actuaries. Actuaries will have to take a meaningful role in life company asset management in the years to come.

MR. STEVEN A. EISENBERG: The first part of this presentation will relate to those assets which back our insurance liabilities. Under the current economic environment many companies have suffered the same fate as the savings and loan industry. Disintermediation has left companies scrambling for cash. Companies are stuck with private placements and bonds that could bankrupt insurance companies if they were forced to liquidate. This is caused by inflation, high interest rates and the associated short-term outlook by the consumer and investor. "Forget about tomorrow; what do I get today?" is the pervasive attitude.

Loyalties are disintegrating. This is noticeable in high policy loans, increasing lapse rates and significant replacement of insurance inforce. We have seen substantial increases in new sales of new low cost term insurance. High yield, investment type products, in the form of annuities and Universal Life, are replacing the lower yield products of yesteryear.

The emphasis is on current high yields, not the 4% long-term guarantees. Consequently, assets must be managed in relation to anticipated cash flows.

During the 1970's we saw a movement toward buying term and investing the difference. In the 1980's the insurance industry has made a concerted effort to regain those lost assets. Today, primary emphasis is on asset building products with significant cash flows. These are taking the form of Universal Life and indeterminate life products, annuities and other forms of investment products.

With these new products we must put forth a stronger effort to immunize the liabilities. We, as actuaries, must get more involved with the investment staff. It is our responsibility to make sure assets are matched with our liabilities. If our companies invest too long, we will again be faced with significant capital losses as interest rates rise. On the other hand, if we invest too short, we may not be able to meet or maintain the high current new money guarantees if short-term rates decline.

Many companies today have products with both new money guarantees and aggregate money guarantees in the same general account. By not segregating these assets, our companies run the danger of losing track of the matching process. Certain lines of business may subsidize other lines. But the most serious problem may be that we don't have the facts to determine current yields or their guarantee periods. In other words, we may not be managing our products intelligently. For example, premium income flow from an annuity with high interest guarantee may be leaving the company immediately in the form of loans and surrenders on older products and other lines. Suddenly, we can find ourselves with assets yielding 7% backing liabilities with 15% guarantees. It is essential that better tracking systems be developed to segregate assets by line of business and by product.

More creative product design can help ebb the flow of funds out of our companies. By rewarding persisting policyholders and penalizing surrenders, more funds may stay with our companies. For example, the introduction of surrender charges, rather than permanent loads, will result in greater retention of funds. The surrender charges may take the form of (a) a flat dollar amount, (b) a percent of premium or a percent of funds, and (c) loss of excess interest.

However, we must still reflect our investment practices in our pricing assumptions. For example, single premium deferred annuities with minimal penalties require a short-term, liquid investment policy. Flexible premium deferred annuities with significant surrender penalties and long-term guarantees require longer term investments.

Do you and your peers advise the investment department of the actuarial assumptions and their implications for investment requirements? Do you then monitor those investments for adherence to your pricing assumption? If not, then you may find that you have mortgaged your company's future. Although our challenges are more complex than ever before, we must meet those challenges and not shirk our responsibilities. Otherwise, the life insurance industry will forever have its own recessions.

MR. RAYMOND J. NACIN: It is important that we as actuaries take a look at the risks that our companies are assuming and price accordingly. With respect to the investment products which are being offered today it is clear that the consumer wants a fairly high rate of return, if not the

highest rate of return available. The consumer doesn't understand how the company has to operate in order to obtain that rate of return. In the case of Universal Life, for example, if interest rates fall, the client is going to try to find another way of obtaining a high rate of return.

At Penn Mutual, particularly in the Pension area, we have been considering whether or not we even want to absorb any type of market value risk. Is that risk something we can transfer to the client? When I think of the products of the 1980's, I visualize us transferring, wherever we can, the market value risk to the client. It is critical that when we as a company do not transfer this risk, we adequately charge for the potential market value loss.

I also envision actuaries getting involved in things which we never got involved in before. I hear us talking about the matching of assets and liabilities. There are all types of sophisticated immunization systems. I get involved in conversations with investment personnel where we are trying to understand what immunization means and how it is applied. There are asset allocation models. There is portfolio management. Actuaries and investment managers must sit down and discuss integrated product and investment strategies. It is important that the investment managers not only understand the underlying investments, but they have to understand the product, the market for the product and the risks involved.

MR. TULIN: I have a question for Mr. Eisenberg and it refers to his comments regarding the annual premium deferred annuity. I agree that you may want to invest long in light of the long-term nature of the guarantee. But you still have the same problem which we have in all individual products today, which is to say that you don't have a specific relationship between the surrender charge and the market value of the assets supporting the liabilities. It is invariably going to happen that the cash-outs are going to occur when the portfolios are under water. Do you see any solution?

MR. EISENBERG: One of the things you can do is to have a surrender charge that is related to the interest rate. One of the things that we have done with our flexible premium annuity products is to basically credit a rate of interest to policyholders who surrender, which is lower than the interest rate which we credit to the policyholders who persist and eventually annuitize. Another thing which can be done in the contracts is to not promise to maintain these new money rates forever. We can, at any time, reduce the interest rate which we credit to the minimum guarantee of 5 or 6 percent. Finally, we need to be ready to change our investment philosophy in the way we credit interest at any time. We maybe need to offer shorter term interest guarantees.

I would like to ask Mr. Tulin to explain what he means by hedging and how it works.

MR. TULIN: If you determine that you have a risk which you don't want, which in our case is the risk that someone would request their money when your portfolio was under water, you can cede that risk off to someone else. Essentially what you do is sell an interest future contract to pay

a certain rate sometime in the future. If interest rates rise you will collect money that is yours because that contract will have no value. If interest rates fall, you will incur a cost, but your portfolio won't be under water. The net effect of the transaction is to level off your yield and insulate you up front from the impact of future changes in the interest environment. What that is going to do, of course, is cost you some yield. You have to sit down with the numbers and determine how much you want to be protected and how big your potential losses are. You can compare your yield after hedging with your yield before hedging but it will always be less.

MR. EISENBERG: I was quite interested in what Mr. Tulin called proportionate segmentation. One of the things we have been struggling with in our company is segregation of assets by what we call product class and also trying to account for these assets and immunize them separately by product class. We happen to have many different products in our company. How do you generally get started in proportionate segmentation? Do you initially have to allocate your assets for the inforce block before you can set your goals for new business?

MR. TULIN: I think that the initial question is the hardest and it depends on the way each company views its own surplus and asset base. Let's talk about the allocation of the initial assets first and then the allocation of the initial surplus, which are really two different questions.

You can allocate the initial assets for internal analysis purposes by simply starting with a given product line, probably your smallest, and choose the assets for that line based on your own profile of what assets that line ought to have given its liabilities today. You continue this process until you reach your final line of business, at which point you will realize that this line does not have at all the assets which you think it ought to have. This is because the investment policy of the past has not really been consistent with this kind of approach. The reason you should end with the largest line is that it is most able to absorb the fluctuations which you are going to have whereas the smaller lines' success in terms of management analysis might easily be warped by this initial allocation.

The question of allocating initial surplus by line of business or by product line is very tricky and it really depends upon (i) how a company thinks about its surplus, (ii) the rates of interest at which a company thinks its surplus lines should advance surplus to the deficit lines and (iii) how much data is available. In many companies the initial surplus is allocated in proportion to the liabilities, particularly if that is the basis the company is using for allocation of investment income. If the data is available you can allocate the surplus in the same way that you allocate investment income and then assume that the assets supporting the surplus of the company are invested in the same manner.

MR. HOWARD L. ROSEN: Along those same lines, if we just restrict our views to Universal Life products and the investments behind them it seems that the need for the product resulted in the investment philosophy. The investment philosophy and the resulting yields then resulted in a marketing strategy. The marketing strategy emphasizing those yields have resulted in regulatory problems. On the one hand, does the product

need to be registered with the SEC, and on the other hand, is it really insurance or some kind of investment which is hidden behind a Section 101A Benefit? In view of this, does anyone have any comments on whether or not the marketing philosophy and the investment strategy is actually killing the product

MR. TULIN: I'm not sure that anything is going to kill the product. It may die a natural death when this temporary phenomenon, the inverted yield curve, returns to normal. Historically there has been anywhere from a 3 to 4 point difference between long-term interest rates and short-term interest rates. In attempting to describe an inverted yield curve to clients, I cannot find any rational basis for short-term rates being higher than long-term rates other than general lack of confidence in the economy and a general instability in the economy. Eventually, instability in the economy will become stability and we will have long-term debt, at which time many of the things you said about Universal Life will have to change. One of the things which will have to change is the investment philosophy which today is very short-term oriented.

Universal Life and the incredible interest in it today are largely driven by the inverted yield curve. I compare it with how Variable Life, which was talked about 6 years ago, would have worked if instead of the market taking a turn for the worst it had been very bullish. Variable Life was a great product for an up market and Universal Life is a great product for an inverted yield curve. I don't believe we as an industry have developed a product which is good for all investment environments.

MR NACIN: There are some real dangers with respect to Universal Life which most companies probably recognize. Many companies have gone to their field force and clients and have said that the traditional whole life policy no longer does the job but Universal Life does do the job, so let's replace that old business with this new concept. What they've done is make the replacement sale respectable. Universal Life will then, in many instances, be sold as a replacement. Universal Life is going to be marketed on the basis of a high rate of return. That's what the client expects. We are planning on obtaining that high rate of return through some sort of short-term investment vehicle. A very possible scenario is that short-term rates drop and that the first generation of Universal Life gets replaced. There is a problem with Universal Life in that the money which you bring in under Universal Life contracts is not really available to do all the types of things or make all the types of investments which you might have been able to do in the past. Where you invest that money is going to be very restricted. It's going to have to be in short-term investment vehicles.

MR. A. ANTHONY AUTIN, JR.: What are the pressures for or against asset management in the state regulatory arena? Do the Standard Nonforfeiture Laws frustrate any asset management attempts? Do any jurisdictions require asset management in part, if not in total, for a new product or product line?

MR. EISENBERG: I can only answer that in part. In California some of the indexed products are going to be subject to state regulatory requirements (e.g. the Universal Life product which is indexed to some

discount Treasury Bills). The state regulatory authorities are going to be looking at the assets backing the product to make sure that they are truly being managed to reflect the yields which are being guaranteed.

MR. MACIN: When you look at a small company or a subsidiary, you'll find that some of the investment limitations, whether they are basket limitations or the amount of an individual issue which you can purchase, can prohibit you from effectively managing your assets.

MR. FRANK J. ALPERT: I was at a meeting of what used to be the C-4 Technical Advisory Subcommittee (it has some other name now) for the NAIC. There was much discussion at that meeting about the kinds of products that have investment orientation. I get the sense that the state regulators, or at least the actuaries in state regulation, are considering ways to get the company actuaries more involved in the requirements to the extent of (i) submitting testing that they have matched the assets and the liabilities for a particular product or (ii) requiring that indexed products be supported by assets related to the index. There is much more that will be done in this area and it is aimed at having the actuary be responsible for some of the results.

MR. EISENBERG: The remainder of this presentation will relate to those assets which are in excess of those required for liabilities (i.e., capital and surplus). Since capital and surplus are limited resources, criteria must be determined for analyzing the alternative demands for capital. In my company, we have set guidelines that will increase the company's value to shareholders. These guidelines are used to determine how current and future surplus should be invested. For example, should we invest surplus in new bonds, stocks or mortgages? Should we invest the surplus in real estate, or maybe in the money market? Or should we, instead, invest it in expansion of our existing business or, possibly, a new line or new market? Maybe we should buy a stock brokerage firm or other business. Basically, we developed methods that allow comparisons among unlike alternative demands on our capital and surplus.

We determined that Anderson's gross premium calculation methods could be applied to any alternative investment of our capital. By determining a required return on investment (the yield rate or hurdle rate), we can discount the available cash flow of any alternative investment at the required yield rate. If the net present value after taxes is positive, then that investment meets our minimum criteria and should improve the value of the company to its shareholders. The yield rate is set at the corporation's cost of equity and debt capital. We have also included in the required cash flows, the estimates of the capital required, over and above surplus strain, just to remain in business. For example, that surplus required by Best's to maintain our A rating is a negative cash flow in the formula.

Although this discounting approach is a minimum requirement for life insurance evaluations, it is not the only requirement. Other requirements include:

- (1) returning the investment in the program within, say, five years;
- (2) a minimum GAAP profit of, say, 10% of premiums and 1% of assets;
- (3) some minimum absolute dollar profit for the total program which may vary with effort (e.g., \$100,000);

- (4) perhaps a long-term stability of profits requirement; or
- (5) an asset building requirement.

Once the criteria for effective use of capital are determined, existing programs should be evaluated to determine whether the continuation of each program meets the hurdle rate. We defined a program as a self-contained unit of business. It could be started and stopped without significant effect on other programs. Our philosophy is that each business venture should contribute its share to the corporate profits. In other words, it makes more sense to continue the program than to stop new sales.

If a program is not achieving its hurdle rate, then an evaluation should be undertaken to determine changes that may be made to achieve the desired results. Programs are re-evaluated on a regular basis to determine their performance in relation to the capital usage criteria. Also, the required yield rates will be re-evaluated periodically to determine whether the corporation's cost of capital has changed.

Finally, all new programs must achieve the corporate capital usage requirements before they can be undertaken.

One of the more difficult and controversial tasks with which my company struggled was the determination of the additional capital to be assigned to each program (a negative cash flow) over and above actual expenses and surplus strain. Although risk theory could have been employed in that determination, we simplified our task somewhat by using certain Best's criteria for our capital requirement. Our assumption was that, at a minimum, we wanted to keep our Best's rating.

We have had our capital usage program for more than a year now. Although there have been some hitches along the way, we are better off having it than not having it.

We now have a method for analyzing all potential programs against a pre-determined minimum criteria. However, one should keep in mind that it cannot be the only criteria. For example, programs with minimum surplus strain may exceed the hurdle rates significantly, yet still have inadequate margins. Also, the risks must be appropriately reflected in the choice of assumptions and hurdle rates. In other words, other actuarial profit indices should be employed in any economic feasibility study.

Our challenges are more complex than ever before. We must meet those challenges, and not shirk our responsibilities, else the life insurance industry will forever have its own recessions.

MR. NACIN:

- I. What are the criteria for the effective use of capital?

Capital can be defined as the amount of cushion we need to take insurance, investment and business risks and to take advantage of opportunities and to grow. It might include surplus, MSVR and capital invested in existing business.

In a mutual life insurance company capital comes from only two sources, permanent and temporary contributions to surplus. Since capital is limited, a company needs to charge for the use of it. Over time a mutual life insurance company's growth rate is constrained by its internal rate of return on invested capital.

There are a number of criteria that can be used to measure the effective use of capital: (1) the absolute dollar amounts of required capital based on a company's expected risk-taking and growth, (2) the internal rate of return on invested capital (this is a discounted cash flow calculation or a modified book profit calculation as set out by Anderson (TSA XI), the modification being the addition of required surplus), (3) the present value of book profits at a stated hurdle rate, (4) statutory, modified statutory and GAAP statements, (5) acquisition expense ratios and (6) agency profitability measures. No one measure gives the complete answer to the effective use of capital but looking at a number of different measures gives a pretty good feel for how a company is using capital.

II. How are the criteria used?

When used most effectively, the criteria are used as management tools to consistently run the company in planning, managing, monitoring, controlling and pricing. Top management needs to understand how to manage capital, growth and surplus strain by varying the growth rate, product mix and allocation of capital between the various businesses.

With respect to purchases the effective use of capital requires cash/benefit analyses with stated hurdle rates and maximum payback periods. In today's uncertain environment five years is the maximum realistic payback period in the life insurance business. We need to ask the question on all purchases, "Will this purchase help us achieve our objectives or not?". Basic good management practice dictates that we understand the business and what is required to do it profitably, and that we don't waste money on non-essentials. We have to be sure that we are buying the things that will make us successful in the turbulent environment of the eighties.

In product development there are a number of things that are required to properly manage capital. We need to understand our capital requirements and constraints and use them in product pricing.

We need to use a formal product pricing method that includes a charge for the use of required surplus. This could be the Modified Anderson Book Profit Method. We need to get the non-actuaries in top management familiar with the chosen pricing method, i.e., how it works and its implications. We need to look specifically at expense strain, reserve strain and required surplus. We need to realize that products can be designed to minimize invested capital and that today the internal rate of return on invested capital needs to be in the neighborhood of 15%. We need to know our various businesses well enough to know where capital can be most profitably invested. We need to relate product profitability to our financial forecasts to assure consistency. We need to know how many years it will take to get our invested capital back. We need to vary our internal rate of return directly with the risk involved. We need to

charge for potential market value losses or transfer the risk to the client.

We need to recognize that the actuary's responsibility in pricing includes assuring that business profitability objectives will be met, assuring that the internal rate of return on invested capital is adequate to compensate for the risk taken and that product design minimizes invested capital and the payback period, particularly if capital is limited.

There are a number of ways to determine how much capital is required. A simple approach is to list the risks and opportunities, a best guess of their likely variation and then sum the variation over at least a five year period. Modelling can be used on either a range or stochastic basis. The following two examples illustrate formulas that have been used for required surplus: 5% of ordinary assets + 3.5% of group annuity assets + 25% of group life and health premiums + 1% of corporate assets.

.05	(Life Net Amount At Risk x Average Mortality Rate)
+.10	(Regular Group Health & Revolving Credit A&H Premium)
+.05	(Cost Plus Annualized Premium)
+.20	(Single Premium Credit A&H Unearned Premium)
+.20	(Collectively Renewable Annualized Premium)
+.17	(Non-Cancellable Active Life Reserve)
+.40	(Guaranteed Renewable Annualized Premium)
+.10	(Health Insurance Disabled Lives Reserve)
+.05	(Non-Life, Non-Pension Exhibit 8 Reserve)
+.05	(Group Pension Reserves)
+.25	(Stock Investment)
+1.0	(Maximum Bond MSVR)
+.02	(Mortgage & Real Estate Investment)
+	(Adjustment for Uncontrollable Outside & Inside Environmental Factors)

We can always refine or argue the formula, but it's critical that we have one that we use consistently.

Whether we state surplus ratios in dollars or as a percent of assets or liabilities, we need to be aware of what the competition is thinking and the various state minimum and maximum surplus levels.

III. Importance of Investment Flexibility

More than ever actuaries are getting involved in investments and developing an integrated product/investment strategy. We find many companies facing huge potential market value losses because of improper matching of assets and liabilities in the past. Many companies are faced with a cash flow or liquidity crunch. Many companies are getting more and more of their investment results from capital gains as opposed to investment income. We are in an environment where inflation, interest rate levels, inversion of short and long term yields and Universal Life cause turbulence and where clients want the highest rate of return and the ability to switch investment bases as conditions change. In terms of investment flexibility the actuary is in a unique position to bring

portfolio management, liquidity planning, asset allocation, immunization, matching and rebalancing to bear on assuring an integrated, effective investment product strategy.