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## THE FUTURE ECONOMY

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- o The discussion will focus on future economic and financial scenarios and the investment vehicles and insurance products most suitable in those scenarios.
  - The economy and the financial marketplace
  - Investment vehicles
  - Insurance products

MR. MICHAEL R. TUOHY: I would like to start this presentation regarding the future in a typical actuarial way by looking at the past. The past ten years have seen dramatic changes in the life insurance industry. What can we learn from this period that would indicate what we can expect in the future?

### REVIEW OF LAST TEN YEARS

The one event that had the greatest impact on the individual life business was the interest spike that occurred during 1980-81. Short-term interest rates peaked at above 20% and had a dramatic effect on products, distribution systems and market shares. Table 1 shows industry life and annuity reserves and total assets for year ends 1976, 1981 and 1986 expressed in 1986 dollars. From 1976 to 1981 life reserves dropped 20% in real terms, while annuity reserves grew 40% and total assets hardly changed. In the period 1981 to 1986, a time of generally declining interest rates, annuity reserves and total assets showed very strong growth but life reserves remained approximately constant.

TABLE 1

#### LIFE INSURANCE INDUSTRY RESERVES/ASSETS (1986 \$ billions)

<u>Year End</u>	<u>Life Reserves</u>	<u>Annuity Reserves</u>	<u>Total Assets</u>
1976	\$300	\$168	\$611
1981	244	235	619
1986	252	477	938

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### Market Share

During the same period we saw a significant shift in the market share of the major life companies. Table 2 shows the market share in terms of total assets and total premium income of seven large mutuals, including their life insurance subsidiaries, for the years 1976, 1983 and 1986. During the period 1976 to 1983 these companies experienced substantial loss of market share measured in terms of both assets and premium income. From 1983 to 1986 some of the lost premium income was regained but the asset position slightly worsened.

TABLE 2  
MARKET SHARE OF SEVEN MUTUAL INSURANCE COMPANIES\*

<u>Year</u>	<u>End-of-Year Total Assets</u>	<u>Premium Income</u>
1976	46%	37%
1983	38	22
1986	37	28

\* Equitable, John Hancock, Massachusetts Mutuals, Metropolitan, New York Life, Northwestern Mutual, Prudential (including subsidiaries)

### Distribution Systems

What happened to the distribution systems during this period? We saw a major move of the so-called captive agents into the brokerage market. The spike in interest rates made the new interest-sensitive products more attractive than the traditional products, allowing new companies to feed off the traditional companies' field forces. At the same time, the big companies were diversifying themselves away from the traditional distribution systems. Some moved from branch systems to general agency in an attempt to reduce acquisition costs. Others experimented with nontraditional approaches. We had the situation where agents were diversifying as to whom they sold for and companies diversifying as to who sold their products.

We also saw the birth of nationwide marketing companies. The most well-known is A. L. Williams, but there are others that now have considerable power in forcing competitive products and competitive commissions from their carriers. And we have seen growth in other distribution channels:

- o Stockbrokers have sold substantial volumes of single premium business.
- o The savings and loans are now beginning to sell insurance products in big volumes. To date the majority of the production has been single premium business.
- o Several companies have offered no-load products to fee-for-service financial planners with only limited success.
- o Numerous experiments in direct response have taken place, but this method of distribution does not appear to have significantly increased in its market share over the period.
- o In the late 1970s big hopes centered on payroll deduction business achieved increased market share, but actual performance has been disappointing.

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- o Several attempts have been made to market through banks with little success. The Citibank/AIG and Bank of America/Capital Holdings experiments were notable failures.

### Products

This has been a very busy decade of product innovation. It began with that crazy term war fueled by the reinsurers fighting for market share without any real thought about profitability. This led to the term replacement epidemic with the agent doing you a good turn each year by selling an even more competitive ART while pocketing another first year commission. Since that time a series of losses have had to be recognized on the reinsurers' GAAP statements.

Then came the interest-sensitive products with universal life leading the way. Most of us have forgotten the original concept of universal life. This was a product with flexible premiums, interest-sensitive cash values, current mortality charges and fully disclosed front-end loads. The theory was that transparent mechanics would force down commissions but agents' incomes would benefit as the better value product would be so much easier to sell. How much of this concept has survived?

- o The flexible premiums are still around, although some companies have switched back to fixed as this seems to encourage better discipline in paying premiums.
- o The interest-sensitive cash values have survived.
- o The mortality charges are often far from reflective of current mortality experience, the excess acting as a hidden load; for example, reverse select and ultimate rates.
- o Nondisclosure of loads has become an art form.

The transparent mechanics became extremely murky allowing the effective loads to increase to levels that allowed traditional commission levels to be paid.

We have seen variable life stutter after October 19, but there was significant growth right up until the crash. And we have seen several single premium products introduced and become major parts of the savings industry. Table 3 shows how interest-sensitive sales ate into the traditional product market share between 1982 and 1986.

TABLE 3  
INDUSTRY NEW LIFE SALES PRODUCT MIX  
(% Premium Dollars\*)

<u>Year</u>	<u>Traditional Permanent</u>	<u>Term</u>	<u>Interest Sensitive</u>	<u>Variable</u>
1982	69%	19%	10%	2%
1983	61	17	20	2
1984	42	14	41	3
1985	36	13	48	3
1986	36	14	46	4

\*100% Annual Premium Plus 10% Single Premium

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There has also been a move by certain companies to invest in bonds of lower quality. Table 4 shows the distribution of life insurance industry assets at the ends of 1976, 1981 and 1986. Very little change has taken place. Between 1981 and 1986 mortgages have decreased and government securities have increased, but this is somewhat illusory as the increase in government securities has been caused by heavy investment in mortgage-backed GNMA's and FNMA's. What the table does not show is the move to junk in the bond category which effectively could be considered as an increase in the corporate stock category.

TABLE 4  
DISTRIBUTION OF LIFE INDUSTRY INVESTED ASSETS

	<u>12/31/76</u>	<u>12/31/81</u>	<u>12/31/86</u>
Government Securities	6%	7%	15%
Corporate Bonds	37	37	36
Mortgages	29	26	21
Corporate Stocks	11	9	10
Real Estate	3	4	3
Policy Loans	8	9	6
Other	6	8	9

### Profit Margins

We have seen a sharp reduction in the profitability of new business. There are several reasons:

1. Many companies are using expense assumptions in pricing that are lower than current experience. I suspect that perhaps as high as 75% of the companies represented in this room fall into that category.
2. Assumed interest spreads are not being earned. This point has received wide publicity, but its impact on overall profitability is less great than the expense overruns. Also acquisition expense overruns are not retrievable whereas an interest spread shortfall in one year may be offset by surpluses in later years.
3. Long-term withdrawal rates have doubled since 1977. Table 5 shows the termination rates for ordinary life policies in force two years or more. Although the rate reduced slightly in 1986, I do not expect it to fall back much further. The antireplacement ethic has disappeared and companies must recognize that their in-force business will always be susceptible to replacement if its competitiveness falls out of line.

TABLE 5  
TERMINATION RATES FOR ORDINARY LIFE POLICIES  
IN FORCE TWO YEARS OR MORE

<u>Year</u>	<u>Rate</u>	<u>Year</u>	<u>Rate</u>
1977	4.7%	1982	7.6%
1978	4.6	1983	8.6
1979	5.1	1984	9.6
1980	5.8	1985	10.3
1981	6.6	1986	9.0

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Another element that affects the ability of companies to offer competitive and profitable products is the extent to which they are prepared to resort to the latest pricing and design gimmicks. These include:

1. Tontine credits in the form of return of cost of insurance rates or retroactive interest credits. If the jump in cash values is properly disclosed these features seem reasonable and should lead to improved persistency.
2. Assumption of improving mortality rates in pricing but no improvement in cost of insurance rates. The policyholder would likely assume that if mortality rates generally improve then cost of insurance rates would go down -- a false assumption.
3. Assumption of an increasing interest spread by duration combined with illustrations showing level credited interest.

The question arises as to when does "clever" pricing and design result in unethical nondisclosure. Those companies not prepared to resort to gimmicks such as these must reduce profit margins to achieve parity in illustrations.

### 1988+

The remainder of this presentation will deal with the future. We analyzed various features of the life insurance industry over the past ten years. How will things change in the next five years?

### Distribution Systems

I believe that we are going to see a strengthening of the so-called captive agency forces. The heyday of the broker may be past. The large companies are now taking a more realistic approach to their field forces. It is not going to be possible for a heavy hitter, who has been at XY Mutual for 20 years, to place \$20,000 a year with the mother company and \$180,000 with Broker Life. There is a move toward larger and more cost-efficient branches, more structured management and greater accountability. The companies that were looking at more diversified distribution systems are now cutting back and concentrating on what they know best, their captive field forces. The move to diversified distribution systems seems to be reversing. The one thing that is worrying to the growth of traditional distribution systems is the reduced emphasis on training new men. I see more emphasis now on recruiting experienced men. If this continues, then the agent population is definitely in danger, because the new recruits will not be coming through to keep up the numbers.

The broker market is becoming very crowded and more and more competitive. Getting a decent return by selling through the broker market is very tricky. The same would apply to those companies dealing with the nationwide marketing companies; their demand for product and compensation is at such a level that it is near impossible to make a buck.

We are going to see an increasing role for financial institutions. The recent progress made by the S&Ls is quite interesting. Admittedly, at the moment they are only selling annuities. But they seem to have gotten over any qualms they might have about selling investment products that compete with their own CDs. They are beginning to enjoy the bottom-line effect of the commissions. I see the S&Ls as potentially expanding into genuine insurance products in quite a big way.

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I do not see the stockbrokers as a distribution source of traditional products. They will continue to sell single premium products where the tax treatment is favorable and they are better values than their other investment products. But I do not see them as a major force in the sale of nonsingle premium protection products.

### Products

I do not foresee a repeat of the product revolution we have experienced over the last ten years. We will see a lot of tinkering with loads, mortality charges, etc., but the basic structure of the products is unlikely to change. Other likely product changes or innovations include:

1. Health care riders to basic life policies. These will be on most product development agendas over the next couple of years.
2. Products designed around the latest tax loophole. Each change in tax law will produce a new series of products.
3. Inflation-linked products. This is a very logical area for product development if there are sufficient inflation-linked assets to match the liabilities. An inflation-linked annuity would appear to have obvious appeal to retirees; however, where this product has been available purchasers have been loathe to give up the high, early payments of a level annuity in order to obtain the inflation protection for later payments.
4. Variable products, especially if Joe's bullish forecast for equities is borne out. It may take a couple of years to overcome the effects of October 19, but the product will be back. Those companies that were developing a variable product should not cease activities. I believe the development will be worthwhile but some of the urgency has disappeared.
5. Low-load group universal life. This product has an important future as the quality product the payroll deduction market needed. Many large professional firms are looking closely at installing such products. This could have a significant impact on traditional agent sales to the professional market.

### Market Share

I foresee the large companies reversing the market share trend that has been experienced since the late 1970s. In addition to the "recapturing" of their field forces, their financial muscle allows them the opportunity for nationwide advertising and, probably more importantly, to exploit the major technological advances that will occur. One important advantage that the large companies are only beginning to address is their existing customer base. Once systems are in place to efficiently tap into that base, significantly more follow-up sales should be achieved with or without the assistance of the original agent.

We are likely to see an escalating number of mergers of small and medium-sized companies in order to achieve critical mass. Table 6 shows that the number of companies grew steadily from 1976 to 1986. However, the number of fleets (groups of companies under common ownership) showed a decrease during 1986. Unfortunately, fleet statistics were only available since 1984.

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TABLE 6

### NUMBER OF LIFE INSURANCE COMPANIES/FLEETS

<u>End of Year</u>	<u>Number of Companies</u>	<u>Number of Fleets</u>
1976	1,742	NA
1981	1,991	NA
1984	2,193	446
1985	2,261	457
1986	2,321	437

Opportunities will exist for smaller companies that do not merge if they are prepared to focus their activities to a particular product line or distribution system. However, if they try to be all things to all people they are unlikely to be around in five years time.

#### Discontinuities

The most dramatic events of the past ten years happened around the time of the interest rate spike, which basically caused a discontinuity for the business. It is interesting to look forward at possible causes of future discontinuities and ask the questions as to how your company would handle such situations. The following are some examples:

- o The inside build-up becomes taxable. Life insurance policies in most countries have received favorable tax treatment. Generally the tax advantages are used to finance the high acquisition costs of life insurance rather than be passed on to the policyholders. If the inside build-up does become taxable the industry must significantly reduce its expenses if it is to continue to compete for the savings dollar.
- o Interest rates return to 1981 levels. Are companies' assets better matched than before or will new money products again cause massive disintermediation? Will the captive field forces increase the outplacement of business to the broker companies?
- o Bank deregulation occurs. Would your company compete head-to-head with the banks or would a joint venture be considered? Would your marketing plans need reviewing? Would any special antireplacement measures be required?
- o AIDS deaths continue to climb. This is a discontinuity we are already experiencing. The additional mortality must be absorbed by the industry. It is really a matter of each company trying to avoid picking up its fair share. A thorough review of your company's AIDS strategy is very worthwhile, as the AIDS losers are going to lose big.

This presentation has focused on life insurance rather than health insurance and has not covered the discontinuity that is currently occurring in the group health market. A comparison of group health market shares of three years ago to that in two years time will show dramatic shifts. Most companies suffered significant losses in 1987 and several are considering exiting the market.

The next five years should be exciting, and probably the event that will have the greatest impact on the business will be one we have not yet considered.

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Therefore, the winners will be those who are organized sufficiently and flexibly to meet whatever changes are demanded of us in a quick and efficient manner.

MR. DAVID F. BABEL: My mission is to "futurize" about the role of investment instruments to the insurance industry. I find the future to be a timely topic for the present, because there are currently megaforces on the horizon that will influence us all. The most major of these forces is the inexorable, accelerated pace with which we are approaching complete financial markets. To a financial economist, complete markets are where there are traded claims to contingent payoffs for all fundamental states of nature. For example, a fundamental state of nature could be characterized as one where short-term interest rates were at 6%, long-term rates at 8%, inflation at 4%, unemployment at 6%, real GNP growth at 2%, etc. A fundamental security would offer, say, \$100 if such a fundamental state occurred and pay nothing otherwise. A second fundamental state could be characterized by the same numbers, except with a real GNP growth of 3%. A complete market would allow for trading securities that have unique payoffs in each fundamentally distinct state of nature. (In technical jargon, we would say that a market is complete when the number of unique, linearly independent securities is equal to the total number of alternative future states of nature.) In practice, it doesn't really take very many fundamentally different securities to offer investors virtually all the advantages of a complete market.<sup>1</sup>

Most existing securities and product innovations represent various unbundlings of complex securities and the combining and repackaging of their fundamental elements. Perhaps the two most important classes of fundamental securities yet to be created are those that let an investor take a clear long or short position in real interest rates and those that allow for trading in pure volatility. Earlier this year a major step was taken toward filling one of these two complete market vacancies with the first public issues of inflation-indexed bonds. One of the indexed bond issues even included a put option that permits the investor to put the bond back to the issuer if real interest rates rise. As the depth of this market increases, investors will be able to take positions in real interest rates by taking offsetting positions in nominal and indexed bonds.

Return briefly to the notion of a fundamental state. A state that is peculiar to an individual or a very small group of individuals, such as the death or poor health of a breadwinner, is not generally considered a state of nature that has economic significance to the broader community. The securities (policies) historically issued by insurers have primarily addressed these narrowly defined states. However, in recent times, insurers have been issuing securities on which payoffs are closely linked to the more broadly defined states. This subtle change in the nature of insurance has drastic implications for how insurers will conduct business in the future. While risk pooling is an appropriate mechanism to manage risk deriving from the former, narrowly defined states, it is inappropriate to manage clustered risks linked to the more broadly defined states.

As I see it, the explosion of new investment vehicles and the approach of complete markets will have ramifications to insurers and actuaries in three areas: (1) financing and investment flexibility, (2) modeling and managing existing products, and (3) developing new insurance products.

<sup>1</sup> See Nils Hakansson, "The Superfund: Efficient Paths Toward Efficient Capital Markets in Large and Small Countries," in *Financial Decision Making Under Uncertainty*, H. Levy and M. Sarnat, editors, Academic Press, New York, 1977.



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I would like to discuss each of these three areas, in turn. Most of my remarks will be directed toward the second area.

### FINANCING AND INVESTMENT FLEXIBILITY

The business operations of most noninsurance companies are financed by issuing debt and equity claims. The financing of business operations is almost incidental to those operations, as the major business focus is really on the asset side of the balance sheet -- whether it be manufacturing autos, constructing commercial buildings, baking pastries, or marketing services. For an insurer, issuing debt and equity claims is not incidental to its operations -- it is the insurer's main business. Issuing liabilities is truly the area of an insurer's expertise and comparative advantage. The collection of assets is really an adjunct to that business.

While all of this is well known to the audience here, it has some important implications for the topics discussed by this panel. I am often approached by insurers wondering how they can achieve high rates of return on the assets backing up a specific product, for example, a GIC, while bearing little credit, liquidity, duration or convexity mismatch risk. When I see the spreads that these insurers must achieve to be profitable, I recommend more often than not that the closest they can come to meeting their objectives is for them to invest in the GIC of one of their competitors. We on Wall Street and in academia are often eroding the market value of their surplus or having one group of claimants subsidize another. The occurrence of either would mean someone is receiving a free lunch. While this cross-subsidy may not show up in statutory accounting statements, it does, in fact, occur.

Now the reason I bring up this point is that writing any kind of insurance policy is really just writing a debt issue. At times and in some markets, getting investable funds by writing insurance can be substantially more expensive than issuing less complex forms of debt, such as commercial paper or medium term notes. I am well aware that companies feel a need to keep their substantial investment in distribution channels alive, and this this may mean in some periods business is written on which a loss is expected. But for an insurer who is trying to maximize firm value, however, a more flexible distribution system could allow an insurer trying to maximize firm value to take advantage of issuing cheaper debt forms when writing policies becomes relatively more expensive . . . or else choose to issue no forms of debt during those times.

In the future, insurers will have much more latitude with respect to selecting an optimal corporate form and balance sheet structure. Numerous alternatives are being developed which allow a mutual insurer to raise substantial capital without demutualizing. Moreover, securitization of distribution channels and policy loans will provide considerable flexibility to the insurer. I see a healthy, more enlightened trend in regulation. Traditional concepts about what constitutes a risky asset are gradually being replaced with ones that recognize the hedging uses of certain investments that were heretofore dismissed as "too speculative."

My colleague at Goldman Sachs, Irwin Vanderhoof, has maintained that additional attention should be placed on investing in equities. While it is true that most insurers are precluded from investing more than their surplus in equities, he feels they need to seek authorized investments that will somehow provide some of the higher expected returns associated with common stock. Two such investments are convertible bonds and junk bonds. Both are, in a sense, hybrid securities which exhibit elements of fixed income and equity securities.

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Accordingly, they can be expected to return more, on average and in the long run, than other fixed income securities.

Under current regulations, both convertible and junk bonds can be used to take a sizable position in equities. Given the very competitive rates of return being paid by some insurers, it would seem virtually essential that such investments become a larger portion of the typical insurer's portfolio. Convertibles and junk also have the advantage of allowing the insurer to book a yield higher than the usual stock dividend yields while patiently awaiting the rewards that come over time to investors in equities.

### MODELING AND MANAGING EXISTING PRODUCTS

A recent survey conducted by the Wharton School's Insurance Department of the 80 largest L/H and P/C insurers in North America yielded an interesting finding.<sup>2</sup> Top executives were asked which of 14 areas of education they would find most important for their future executive hires to possess. One-third of the respondents were CEOs, while the rest included Chairmen, Chief Operating Officers, Chief Financial Officers, CIOs, Chief Actuaries, Portfolio Managers, and Executive VPs of Marketing. The number one educational priority for the group as a whole was the teaching of "financial valuation models as opposed to actuarial valuation models of insurance products." Now I'm not sure exactly what these executives had in mind when they revealed this preference, or even how much they know about actuarial or financial valuation models. I suspect what they were saying, however, is that they feel a need to concentrate more on how decisions influence true economic or market value rather than simply how they affect book profits or regulatory posture. Last month I was showing these survey findings to Vic Moses, Chief Actuary of GNA. I think his reaction was right on target. "There should be neither actuarial nor financial valuation models -- only market valuation models. What I really want is a model that will tell me what something is worth in dollars. There is no such thing as an actuarial dollar, neither is there a finance theory dollar, but only a dollar." I agree. As these two types of models get closer and closer to deriving actual market values and their behavior under various scenarios, the approaches must converge in technology.

Once it is recognized that insurance policies, in large measure, are simply fancy ways of combining and repackaging financial instruments that are actively traded in the marketplace, then pricing the policies and modeling their behavior should not be undertaken independent of the market. The way one would go about pricing such policies, therefore, is to collect an appropriate bundle of traded securities whose behavior mimics that of the policy, then price that bundle, and add on a charge for mortality. Notice that in so doing, traditional loadings for risk or risk of ruin are inappropriate. In the financial marketplace certain risks are priced and others are not.

In early finance theory, we made a distinction between diversifiable and nondiversifiable risk. There is a reward paid by the marketplace for absorbing nondiversifiable risk, but not for taking on diversifiable risk. And whether or not a risk is considered diversifiable is independent of the book of business or portfolio of a particular company.

<sup>2</sup> "Insurance Pedagogy: Executive Opinions and Priorities," (with David R. Klock), *Journal of Risk and Insurance*, forthcoming, 1988.

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Today we simply speak of fundamental factors, and that each factor which is priced will return a premium (negative or positive) apart from the risk-free rate of interest. An asset or liability, then, would be expected to return or cost an amount that would depend on its factor loadings.

An example of a risk for which one should not expect to receive reward, under competition, is mortality risk. Now there was a time when the insurer offered many unique products. When a product is not replicable and tradable, and where little competition exists or information is costly, a load can be added and the issuer will be rewarded. Policy loan and lapse options, for example, were difficult, if not impossible, to replicate. However, within the last few years, traded instruments have become available that directly mimic these provisions. Thus, in competitive markets, the insurer should not expect to be paid an excess premium for these options except to the extent of an information shortage for consumers, or for convenience packaging compensation.

Another example of a risk for which the marketplace apparently pays no reward, on average, is interest rate risk. A popular notion among insurers and some other players in the marketplace, who are closely tied to book yield, is that there is an expected economic reward to assuming interest rate risk. This is a rather curious belief. A company may have equal interest rate risk by having assets either shorter or longer in duration than liabilities. Yet the insurer cannot be expected to be compensated for risk in both directions, for what is compensation for taking one position would be a penalty for the other. An insurer may reply to this point that, for example, "The current shape of the yield curve indicates one gets paid for going long on assets relative to liabilities." But the massive scientific research over the past few decades does not, on the whole, support this notion. While it is true that the insurer may be able to show more quickly high book yields by investing long, most studies have concluded that, with the possible exception of going out the yield curve up to two years, there is no systematic reward to investing where yields to maturity are highest. For example, between 1934 and 1986, investing in 30-year treasuries would have generated the same average annual returns as investing in a series of 90-day T-Bills. If one includes the 1926-1933 period, going long does win out, but there was a great depression that took long yields to the 1.3% level, which created large capital gains. Given our huge national debt, it is now unlikely in my view that we will have a return of such widespread deflation in the foreseeable future, so the period starting in 1934 is probably more representative.

A recent insight from financial economics that would be helpful in actuarial modeling is that it is invalid to apply a single discount factor, or even separate factors, for each point along the yield curve, to cash flows that are sensitive to the levels of interest rates. And when you think about it, virtually all life insurance cash flows are sensitive to interest rates, not only with the new interest-sensitive life products, but also with the more traditional products. For example, lapses are sensitive to interest rate levels and crediting spreads. We have found mortality to be quite sensitive to lapse rates, as it is usually the healthier insureds that lapse and take their business elsewhere when interest rates rise. Other obvious examples of interest-sensitive cash flows are dividends and policy loans.

The correct procedure for ascertaining present values of these interest-sensitive cash flows involves discounting them by a sequence of short-term forward rates of interest for each path that interest rates might take that would give rise to

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these cash flows. The difference in present values between the traditional procedure and the correct procedure is often of the order of 5% to 10%. While this may seem a tolerable error, it is useful to remember that surplus often constitutes 5% of an insurer's total assets! Thus, an error of this magnitude could lead to practices that have significant impact on the accumulation of economic surplus.

A frequent retort is that discounting cash flows by a myriad of interest rate paths is overkill, because there is such great uncertainty about the ultimate sizes and timing of these cash flows. Part of the uncertainty is because insureds do not exercise their options optimally. While this may be true, it does not mean that the market cannot attach a single market value to these liabilities. Mortgage-backed securities have considerable cash flow uncertainty due to the inefficient exercise of prepayment options held by borrowers, yet the market is able to assign a dollar value to pooled mortgages. Models based on correct stochastic procedures can derive prices that are very close to observed market values. Clearly, techniques for modeling mortgage-backed securities have a close link to those appropriate for modeling life insurance products.

We should keep in mind when valuing liabilities that their market value is unrelated to scenarios that the actuary or anybody else feels may unfold in the future. Market value is related to the market consensus on the future interest rate volatility, which can be extracted from the prices of simpler securities.

Once we have developed good models for how market values of liabilities behave under various scenarios, we have what is necessary to begin a viable program of asset/liability management. Until then, we have liability models that are essentially incompatible with the asset models, with focus on market valuation, and we are relegated to managing accounting statements rather than economic value.

Several recent and new investment products have been introduced which should receive the serious attention of actuaries involved in new product development and investment management. In reviewing your spring meeting program, I noted a workshop and a seminar format session devoted entirely to new investment vehicles. At those sessions, futures, options, swaps, mortgage-backed securities, collateralized mortgage obligations, strips, and synthetics are described in greater depth. Each of these vehicles is an important tool in managing or altering the interest rate exposure of a company. However, there are several investments not listed in the program descriptions for these sessions which are at least as germane to an insurer. They are interest rate caps and floors, put bonds, superfloaters, inverse floaters, inverse superfloaters, perpetual floaters, variable coupon renewable notes (VCRs), adjustable rate mortgages (ARMs), principal onlys (POs), interest onlys (IOs), and swap options. Each of these deserves careful study to determine its relationship to the kinds of insurance products and interest rate exposure a company has. One benefit from such an investigation is learning how market valuation models are able to handle such exotic instruments. Some are so closely related to the insurance business that their valuation technology is directly transferable.

For example, let us consider interest rate caps. A cap is a multiyear contract which makes periodic payments to the investor whenever interest rates rise above a prespecified level. The payment amount varies directly with interest

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rates as they rise above a trigger level, but is zero during periods when they fall below the trigger level.<sup>3</sup>

Not only are the caps an excellent tool for hedging against lapses, policy loans, and inflationary effects on health costs, the technology developed to price caps is directly applicable to properly valuing policy loan options. A recent doctoral dissertation at Wharton by Marc Godin, ASA, applied this technology to value the policy loan options. He found that before the 1986 Tax Reform Act, the fixed-rate policy loan option, if efficiently exercised, was worth between 15% and 40% of the present value of all expected future premiums from a policyholder, depending on age, tax bracket, interest levels and volatility. After factoring in the inefficiency with which these options are utilized by policyholders, he found their market value to be a fraction of the former figures, but a sizable fraction, equal to the surplus of many companies. Few of us would doubt that these loan options were underpriced. In some cases, they were virtually given away.

This is not the place for a full discussion of how these new investment vehicles work. Each would consume a workshop session. I recommend that interested parties obtain literature from their investment houses in order to obtain an understanding of them.

### DEVELOPING NEW INSURANCE PRODUCTS

The new investment products that I see on the horizon will give rise to the development of a host of insurance products. As previously implied, most new investment products will be related to the development of different fundamental securities such as those which allow for taking positions in inflation and pure volatility. Some obvious insurance products for the future that will be made feasible with the deepening of the market for inflation-linked bonds are indexed life insurance, postretirement health insurance, and cost-of-living annuities and their many variants.

I have been writing on these topics since 1977,<sup>4</sup> yet, with only a few isolated exceptions, little has happened to bring about the marketing of such products in this country because of a lack of appropriate investments that allow insurers to lay these risks off to the capital market.

<sup>3</sup> See "Capping the Risks of Life Insurance Policy Loans and Lapses," *Insurance Perspectives*, November 1986, and "Capping the Interest Rate Risk in Insurance Products," (with Peter Bouyoucos and Rob Stricker), *Insurance Perspectives*, February 1988, both published by Goldman, Sachs, & Co.

<sup>4</sup> My first article on this was written in Portuguese: "Inflação Esperada e o Custo do Seguro de Vida," *Revista Brasileira de Mercado de Capitais*, Vol. 3, No. 8 (May/August 1977). Subsequent articles in English are: "Monetary Correction in Brazil: Effect on Life Insurance," *Latinamericanist*, Vol. 13, No. 1 (Fall 1977); *Inflation and Indexation in Brazil: The Influence on Life Insurance*, Ann Arbor Microfilms, August 1978; "Inflation's Impact on Life Insurance Costs: Brazilian Indexed and Nonindexed Policies," *Journal of Risk and Insurance*, Vol. 46, No. 4 (December 1979); "Inflation, Indexation, and Life Insurance Sales in Brazil," *Journal of Risk and Insurance*, Vol. 48, No. 1 (March 1981); "Real Security: The Case for Inflation-Indexed Government Bonds," (with Leo Helzel), *Barron's*, March 1, 1982; "Real Immunization with Index-Linked Bonds," *Financial Analysts Journal*, November/December 1984.

## PANEL DISCUSSION

There are two other major areas where I see new products being developed. One involves making rather simple modifications to existing product lines based on insights from modern financial economics. For example, economic theory would indicate that term insurance policies could be made more attractive to consumers, sales agents, and the companies if they were to have their loading design altered.<sup>5</sup> Other paradigms from financial economics show us how to structure the accumulation of cash values in a manner that reduces the likelihood of lapsation.<sup>6</sup>

The other major area is in customizing insurance for risks that were heretofore considered uninsurable.<sup>7</sup> Most risks that are identified as uninsurable are somehow not amenable to the pooling of risks concept that underlies current insurance practice. But many of these same risks are amenable to insurance through the risk-hedging concept. It is very expensive for a given company or individual to synthesize the appropriate hedge for certain risks, yet an insurer, with its considerable expertise, could perform this service on a cost-effective basis in many cases. Risk-hedging insurance, in some lines, is more likely to be sold by P/C insurers.

I will not delve further into the area of new product development at this time, for it is the province of our next panelist.

MR. JOSEPH E. WHITBREAD, JR.: Loomis, Sayles & Co. manages approximately \$20 billion of stocks and bonds (as of December 31, 1987). We are not market timers, so we typically invest for the long term. Obviously, this strategy works best when one can look forward to average historical or above average prospective returns on marketable instruments. That is the case now. What I intend to do today is to share with you why we are upbeat about the future. The essence of our optimism can be summed up in two words: *continued disinflation*.

Our most recent semiannual assessment of the five-year outlook for financial assets, conducted in January, led us to expect a nominal total return for common stock -- dividend yield and price appreciation, with dividends reinvested -- of 16.7% per annum from the end of 1987 through year-end 1992. This is one-third more than the projected annual return from buying and holding high-grade corporate bonds and nearly three times what a cash equivalent should provide. Adjusting for the forecast of consumer price inflation of 3.5% per year -- precisely the rate of inflation since 1981 -- stocks have the potential to provide a real return (i.e., growth of purchasing power) of nearly 13% per annum. Corporate bonds are projected to return 8.5% per year in deflated terms and cash 2.3% per annum. All of these returns are of above average proportions, as

<sup>5</sup> See "Pareto Optimal Design of Term Life Insurance Contracts," (with Nicholas Economides), *Scandinavian Actuarial Journal*, 1985.

<sup>6</sup> See "Aspects of Optimal Multiperiod Life Insurance Contracts," (with Eisaku Ohtsuka), *Journal of Finance*, forthcoming.

<sup>7</sup> "Insuring Against Default on Third World Debt," presented to the American Risk and Insurance Association, 1984, and "Insuring Banks Against Systematic Credit Risk," working paper, Wharton School, 1986.

## THE FUTURE ECONOMY

I shall demonstrate. Thus, a portfolio which emphasizes long-term capital accumulation would have a strong representation in equities. Corporate bonds are attractive also for accounts where diversification is a requirement.

### PROJECTED PURCHASING POWER OF SELECTED FINANCIAL ASSETS 1987-1992

(Percent per Year)

	<u>Nominal</u>	<u>Real</u>
Common Stock	16.7	12.8
Corporate Bonds	12.3	8.5
Cash Equivalents	5.9	2.3
Memo: Consumer Prices	3.5	---

Most people are aware that common stocks compensate for their relatively high riskiness by providing superior returns over long periods of time. That is a well-known historical fact that is, in effect, replicated in our projections.

### COMPARATIVE TOTAL RETURNS 1926-1987

(Percent per Year)

	<u>Nominal</u>	<u>Deflated</u>
Common Stocks	9.9%	6.6%
Corporate Bonds	4.9	1.8
U.S. Treasury Bonds	4.4	1.3
U.S. Treasury Bills	3.5	0.4
Memo: Consumer Prices	3.1	--

It is less well known that stocks have turned in an above average return (for stocks) in periods of low inflation. Before demonstrating this vital fact, let us examine the record of inflation as measured by consumer prices. We have (somewhat arbitrarily) divided the past sixty-two years into six episodes. There has been an interval of deflation (defined as a falling general level of prices), two periods of high inflation and three segments of either low or low-to-moderate inflation. Currently we are experiencing low-to-moderate inflation -- the 3.5% per annum of 1981-87 matches the 3.5% compound rate for 1925-1987, but compares favorably with the 7% pace for 1965-1981 -- and we have chosen to label this as disinflation.

### INFLATION FROM 1925-1987

(Percent per Annum)

<u>Interval</u>	<u>Consumer Prices</u>	<u>Label</u>
12/25 - 12/32	(4.4)	Deflation
12/32 - 12/40	0.9	Low inflation
12/40 - 12/51	5.9	High inflation
12/51 - 12/65	1.3	Low inflation
12/65 - 12/81	7.0	High inflation
12/81 - 12/87	3.5	Disinflation

## PANEL DISCUSSION

Generally speaking, returns on stocks and bonds vary inversely with the rate of inflation. To some extent this is revealed in the generally better nominal total returns evident in periods of either low inflation or disinflation.

### NOMINAL TOTAL RETURNS BY INTERVAL

(Percent per Year)

<u>Interval</u>		Returns		
		Stocks	Corporate Bonds	Cash
12/25 - 12/32	Deflation	(3.3)	5.3	2.7
12/32 - 12/40	Low inflation	11.0	7.0	0.1
12/40 - 12/51	High inflation	14.3	2.1	0.6
12/51 - 12/65	Low inflation	14.6	2.8	2.5
12/65 - 12/81	High inflation	5.9	2.9	6.8
12/81 - 12/87	Disinflation	17.5	18.3	8.1

Deflating nominal returns by the consumer price index more clearly reveals the inverse relationship between the purchasing power of financial assets with inflation. The low inflation-disinflation spans all were characterized by double-digit rates of gain for the purchasing power of stocks. Bonds also tended to do well during periods of low inflation. (The 1940-1951 experience encompasses WWII and the so-called Federal Reserve-Treasury Accord with pegged nominal long-term Treasury bond yields at a low level to assist in the debt financing of the war.) Conversely, an above average inflation experience typically has been associated with inferior deflated returns.

### DEFLATED TOTAL RETURNS BY INTERVAL

(Percent per Year)

<u>Interval</u>		Returns		
		Stocks	Corporate Bonds	Cash
12/25 - 12/32	Deflation	1.1	9.7	7.1
12/32 - 12/40	Low inflation	10.0	6.1	(0.8)
12/40 - 12/51	High inflation	8.4	(3.8)	(5.3)
12/51 - 12/65	Low inflation	13.2	1.4	1.1
12/65 - 12/81	High inflation	(1.1)	(4.1)	(0.2)
12/81 - 12/87	Disinflation	13.5	14.3	4.4

There are many possible explanations for the negative correlation between returns and inflation. One very elementary reason often is overlooked, however. While profitability of industrial corporations in nominal terms typically is insensitive to the rate of inflation -- if anything, profitability increases slightly during an episode of high inflation -- real profitability tends to vary systematically and inversely with respect to inflation. In other words, deflated profitability, or the purchasing power of profits, suffers during times of high inflation and flourishes during periods of low inflation. Investors do not suffer from money illusion.



## THE FUTURE ECONOMY

### PROFITABILITY OF INDUSTRIAL CORPORATIONS

Interval	Operating Report Divided by Sales		Earnings Per Share Divided by Book Value	
	Nominal	Deflated	Nominal	Deflated
1952-1965	15.08%	13.75%	11.62%	10.29%
1966-1981	14.75	7.76	13.15	6.16
1982-1986	13.36	10.06	12.33	9.03

As has been already mentioned, our baseline forecast is for consumer price inflation to average 3.5% per year from 1987-1992, exactly equal to the trend of inflation over the past sixty-two years and identical to the 1981-87 experience. Many ingredients enter into this calculation. Time does not permit a complete review of all of them. We would be remiss, however, if we did not mention some of the more important elements. Productivity embodies a confluence of forces -- economic, demographic and cultural -- which bear vitally on the potential rise in the standard of living and the associated rate of inflation. Over the next five years we project productivity -- defined as real GNP per hour of work -- will improve at a 1.3% per annum clip. This is not high by postwar standards or by comparison with recent experience, but it represents a quickening versus the 1970s. Slower population growth -- an outgrowth of lower fertility rates -- presages a more mature population with greater skills. Less rapid civilian labor force growth will ensue also, even with further increase in the participation rate of females, which will lead to a natural downtrend of the unemployment rate along with a need to raise the ratio of capital to labor. Synthesizing these and other influences is not an easy task, of course, but our calculations imply respectable future productivity increments, a harbinger of low-to-moderate inflation.

#### ASSUMED PRODUCTIVITY\*

(Percent per Annum)

Span	Growth Rate
Prior 5 Years	1.3
Prior 10 Years	0.9
Prior 31 Years	1.5
Next 5 Years	1.3

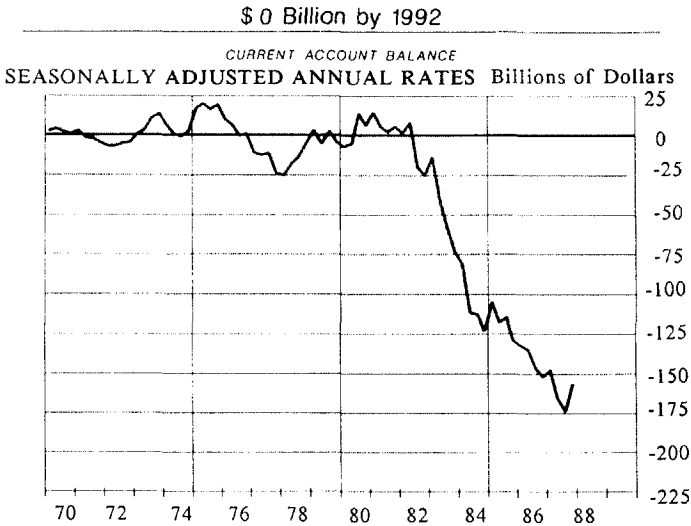
\*Real GNP per hour of work.

The future path of inflation also depends importantly on the type of economic policy which will be forthcoming. We are not presumptuous as to forecast the winner of this year's presidential election. Nor is it obvious that the winner will be able to implement the programs which will be articulated over the next few months. It is still possible to identify some essential changes in the direction of economic policy which are highly likely to occur, however. First and foremost, it is clear that the growing net external indebtedness of the U.S. to foreign citizens and foreign governments -- the counterpart of a huge deficit on current account in the balance of payments -- is a source of instability. The world is on the verge of drowning in dollars unless we significantly pare the amount of red ink in the current account. Indeed, if we are to meet debt service requirements on the growing pool of debt, it is incumbent upon the U.S. to shift to

## PANEL DISCUSSION

a current account surplus by the early-to-mid-1900s. To procrastinate is to risk a crisis for the dollar of the first order of magnitude. We do not believe that responsible public officials will countenance the greenback being relegated to the status of a second-tier currency. Therefore, we have assumed that exports of goods and services will rise and bring the current account approximately into balance by 1992. (See Graph 1.)

GRAPH 1

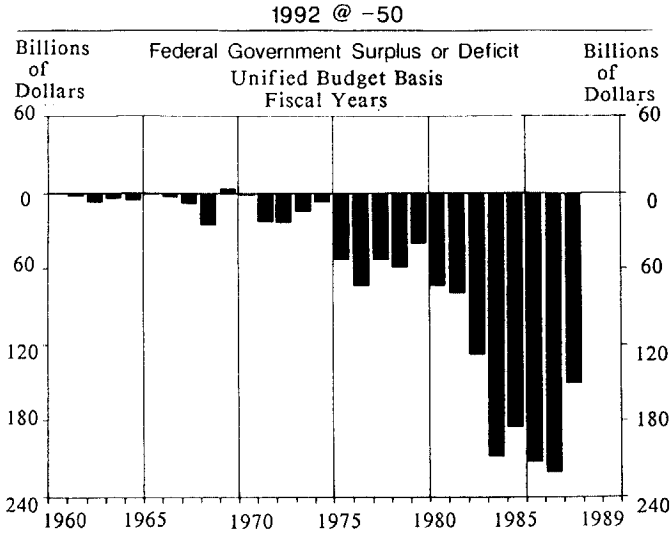


Clearly this is a tall order. It will not be accomplished easily or painlessly. It implies a much cheaper dollar and/or a reorientation of fiscal policy. Simulations of a macroeconomic model demonstrate conclusively that reducing the federal budget deficit is an effective complement to a less expensive currency if the goal is to pare the currency account deficit. Higher taxes would be especially potent in this regard. Consequently, whether it comes about via adherence to a Gramm-Rudman-Hollings style stepwise reduction or in some other manner, we have assumed that national officials will strive earnestly to sharply reduce the federal budget deficit by 1992. (See Graph 2.)

Briefly recapping, we have assumed the following policy thrusts over the next four to five years: higher taxes, a cheaper currency and a reduced reliance on foreign investment. These have conflicting implications for inflation. A depreciated currency is proinflationary whereas budget restraint is anti-inflationary. In the final analysis, however, inflation is a monetary phenomenon. Hence, the last vital policy premise is that monetary policy will be oriented toward preservation of disinflation.

THE FUTURE ECONOMY

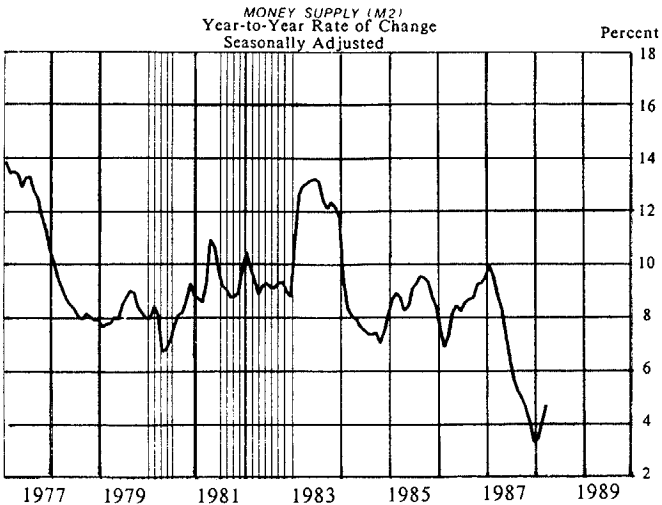
GRAPH 2



Specifically, in Graph 3 the M2 measure of money will expand at a 6% annual rate. This should permit a similar growth rate for nominal GNP, composed of a 2.4% gain of real output and inflation of 3.5% per annum.

GRAPH 3

Medium Single-Digit Growth for Money Through 1992



## PANEL DISCUSSION

Looked at another way, real output of roundly 2.5% per year will preserve a margin of slack in the economy and forestall demand-pull inflation. In other words, mediocre growth is the price that will have to be paid to keep inflation in check.

Provided one goes along with the above arguments and outlook, there are a few additional steps necessary before one can develop the implications for future financial asset returns. Our valuation approach to common stock is a variation on a classical dividend discount formula (a la Gordon-Shapiro). It necessitates that we formulate explicit assumptions about: (1) the future normal growth of dividends; (2) the prospective level of interest rates; (3) the dividend payout ratio; and (4) a risk premium for stocks. The twist in our work is that we post that investors in stocks demand a risk premium relative to inflation rather than bonds. In other words, our thesis is that holders of equities may be thought of as preferring a return over and above expected future inflation more so than expecting a premium for the relatively greater risk of owning stocks as opposed to bonds.

Let us begin with the assumptions for cash and bonds. Our base case envisions a real interest rate (nominal yield to maturity less inflation) of 5% for bond investors. (The real rate for cash equivalents is one-half that of bonds.) The future normal growth rate consists of inflation post-1992 -- stipulated as being equal to inflation for 1987-1992 -- and real growth after 1992. The latter requires a brief explanation. It is assumed that the rate of real economic output advance will accelerate somewhat after 1992 as the drag emanating from the need to sharply curtail the federal budget deficit is no longer present.

### ASSUMPTIONS FOR RETURNS ON CASH AND BONDS

	<u>Lower Inflation</u>	<u>Base Case</u>	<u>Higher Inflation</u>
Probability	0.15%	0.70%	0.15%
Real Interest Rate, 1992	4.50	5.00	5.50
Inflation After 1992	2.50	3.50	4.50
Real Growth After 1992	3.20	2.70	2.20

A few comments on the valuation parameters for equities should suffice. The inflation premium for stocks has been set at 6.5% for stocks. If one will recall the historical record presented earlier, this amounts to a near trend value for the risk premium. Future normal growth is the joint product of real output post-1992 and inflation after 1992. The dividend payout ratio has been set at approximately its postwar (1946-1985) average (51.43%). Earnings per share were derived from a profits model which depends, in turn, on the general economic forecast. The growth rate of earnings to 1992 is ambitious and it implies a high return on equity as of 1992. Higher taxation will impede the growth of earnings, but nonetheless, we believe that profitability will rise from subnormal levels in the 1980s to an above average level in the 1990s. There is ample precedent for rising profitability in the context of disinflation and it is our belief that profits will improve handsomely.

## THE FUTURE ECONOMY

### ASSUMPTIONS FOR RETURNS ON STOCKS

	<u>Lower Inflation</u>	<u>Base Case</u>	<u>Higher Inflation</u>
S&P 500 Earnings per Share, 1992	\$28.00	\$30.00	\$32.00
S&P 500 Dividend Payout Ratio, 1992	55.00%	52.00%	48.00%
S&P 500 Dividend, 1992	\$15.40	\$15.60	\$15.35
Future Normal Growth After 1992	5.50%	6.00%	6.50%
Inflation Premium for Stocks	6.50%	6.50%	6.50%

The above assumptions also indicate that we have developed less optimistic and more optimistic alternatives to our central expectation. As will be seen later, these permit us to evaluate the sensitivity of the results to changes in the assumptions and afford a means of tracking actual values against the basic inputs.

At last, we are ready to meld all of these figures into expected total returns for stocks, bonds and cash. Cash equivalents do not look inspiring with a return of roughly 6% in the base case. This is so despite the presumption that such instruments will offer a respectable real return of 2.5% per annum.

### RETURN ON CASH

	<u>Lower Inflation</u>	<u>Base Case</u>	<u>Higher Inflation</u>
Initial Yield	5.68%	5.68%	5.68%
Final Yield	4.80	6.00	7.30
Total Return per Year	5.10	5.90	6.70

Bond returns are potentially more lucrative. Bond yields are projected to decline significantly and the resulting price appreciation will supplement coupon income. Even in the higher inflation case (4.5% per annum CPI) bonds provide a total return equal to the initial yield to maturity and handsomely in excess of prospective inflation. Indeed, bonds should provide a positive real return unless future inflation exceeds 6%. Moreover, the base case is predicated on a conservative (i.e., high) real interest rate assumption. It is conceivable that the real interest rate may be less than 5% if conviction in the stability of disinflation rises. In such an eventuality, bonds would provide larger total returns than portrayed.

### RETURN ON BONDS\*

	<u>Lower Inflation</u>	<u>Base Case</u>	<u>Higher Inflation</u>
Initial Rate, 12/31/87	10.06%	10.06%	10.06%
Price of Bond	\$ 87.60	\$ 87.60	\$ 87.60
Interest Rate, 1992	7.00%	8.50%	10.00%
Price of Bond, 1992	\$115.50	\$101.10	\$ 89.10
Total Return per Year	14.60%	12.30%	10.10%

\*8 5/8% coupon, 21-year corporate bond

## PANEL DISCUSSION

Common stocks offer truly mouth-watering returns. It should be emphasized that the base case P/E of 15 is roughly where we are today and a bit below the price-earnings multiple which prevailed at the end of last year (15.6). Even in the more conservatively valued, higher inflation case, equities would offer an attractive real return of roundly 9% (13.5% less 4.5%).

### RETURN ON STOCKS

	<u>Lower Inflation</u>	<u>Base Case</u>	<u>Higher Inflation</u>
Price of S&P 500, 12/31/87	\$247.08	\$247.08	\$247.08
Dividend, 1987	\$ 9.00	\$ 9.00	\$ 9.00
Earnings, 1992	\$ 28.00	\$ 30.00	\$ 32.00
Dividend, 1992	\$ 15.40	\$ 15.60	\$ 15.35
P/E Ratio	18	15	12
Price of S&P 500	\$505.00	\$450.00	\$385.00
Total Return per Year	19.20%	16.70%	13.50%

Putting this all together, stocks appear to be the financial asset of choice for capital accumulation over the next few years. Bonds are attractive also, but somewhat less so than equities. Cash is a distant third.

### PROJECTED NOMINAL RETURNS ON ASSETS

1987-1992

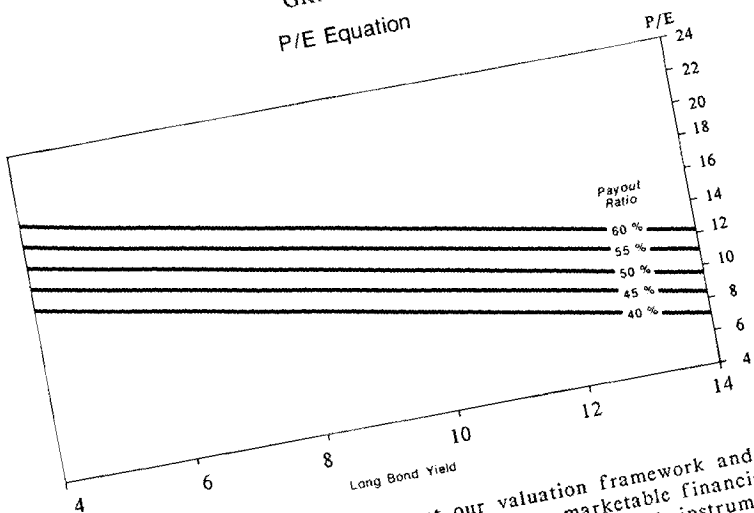
(Percent per Annum)

<u>Assets</u>	<u>Lower Inflation</u>	<u>Base Case</u>	<u>Higher Inflation</u>	<u>Probability Weighted</u>
Stocks	19.2	16.7	13.5	16.6
Bonds	14.6	12.3	10.1	12.3
Cash	5.1	5.9	6.7	5.9

Of course, not everyone can invest for the long haul. Stated differently, the timing of the sale of stocks, in whole or in part, cannot always be precisely set in advance with certainty. Thus, it behooves us to consider when the market is becoming significantly overvalued or undervalued. This can be used as an aid to augment total returns via judicious purchases and sales of common stocks either for cash or for investment in bonds. Our approach to this issue is to develop guidelines for valuation excesses. Specifically, the P/E on the Standard & Poor's 500 Composite Index has been related to the level of the high-grade corporate bond yield and to the dividend payout ratio for the SPCI. Actual values can be compared to a so-called theoretical value based on a regression equation amongst these variables. The standard error of the regression is approximately one P/E. An actual P/E more than one above and below the theoretical counterpart would suggest a valuation aberration with about a 67% probability. A difference of two or more between actual and theoretical P/E would strongly suggest (99% probability) a major valuation deviation has occurred. (See Graph 4.)

# THE FUTURE ECONOMY

## GRAPH 4 P/E Equation



In conclusion, as mentioned at the outset our valuation framework and the inputs thereto encourage us to be upbeat about the future marketable financial instruments. If, as we surmise, inflation will remain subdued, such instruments will be rewarding investments.

