

RECORD OF SOCIETY OF ACTUARIES

1982 VOL. 8 NO. 1

PENSION FUND FINANCIAL PLANNING IN AN INFLATIONARY ENVIRONMENT

*Moderator: BENTTI O. HOISKA. Panelists: JEFFREY J. FURNISH, RONALD A. KARP, ROBERT W. RYAN, IRWIN TEPPER**

MR. JEFFREY FURNISH: Today I would like to outline the concepts discussed in my paper, "Pension Plans in an Inflationary Environment," and consider these concepts as they relate to the practical aspects of pension consulting.

We begin by considering a plan sponsor whose primary concern is the financial risk created by an inflationary environment. Taking inflation to mean the tendency of wages and prices to increase in tandem, two aspects of these increases have been especially troublesome in recent years--the unprecedented and sustained high level of these increases in this country and their highly erratic fluctuations. It is difficult to imagine a sponsor not concerned about a prime rate that has surpassed 20% and has repeatedly moved several percentage points over fairly short periods. This inflationary environment destabilizes our pricing structure for capital, creating several problems for the plan sponsor.

First and foremost, the financial uncertainties of doing business increase. This economic fact makes all retirement issues pale by comparison, and in my opinion a consultant must consider retirement program decisions in this light to effectively serve the sponsor.

A second problem created by inflation is the uncertainty injected into the benefits ultimately delivered by a retirement program. There are at least three reasons for this. First, the present value of a pension benefit deferred to normal retirement age declines as interest rates increase. The amount of a "defined pay-related benefit" becomes less certain as pay structures destabilize. Uncertainty concerning Social Security destabilizes integrated plans, as reduced Social Security benefit levels raise expected benefits under offset formulas, while the increasing wage base reduces expected step-rate benefits.

A third problem concerns the stability of the funding structure. The actuary's task of establishing long-term assumptions becomes more difficult as volatility increases. Many sponsors of final pay programs have seen inflating payroll costs combined with market value declines in the plan assets result in escalating contribution rates.

In such an environment, the inflation-conscious sponsor will strive to minimize the financial risks which surround him, including those associated with the retirement program.

In comparing defined contribution and defined benefit programs, it is apparent that the sponsor will prefer the defined contribution approach

*Mr. Tepper, not a member of the Society, is president of Irwin Tepper Associates.

for several reasons: all risks relating to future experience can be transferred to the employee, benefits are fully funded, and contributions may be totally discretionary. The major disadvantage is the payment of larger termination benefits under the defined contribution program. The sponsor must decide whether this is an appropriate premium to pay for the increase in financial certainty. Assuming that he does decide this is an appropriate premium to pay, the sponsor will use a defined benefit plan only to solve those problems of benefit delivery which can not be met under the defined contribution arrangement. What are these problems?

Defined contribution plans can be designed to deliver benefits as life annuities. Also, it can be shown that where annual pay increases and investment returns are equal, the account balance at retirement is a function only of final pay, the employer's contribution rate, and the employee's years of service. Finally, at current interest rates, the integration with Social Security available under defined contribution programs is roughly equivalent to that under a final pay defined benefit plan.

Over the long run, the sponsor can achieve fully integrated benefit delivery closely related to final pay by making annual contributions which are stable as a percentage of payroll and by following an investment strategy designed to meet or exceed average pay increases. The major potential shortfall of this approach would be a failure to meet assumptions. This is precisely the type of risk our sponsor may wish to transfer to employees.

Assuming that an effective investment strategy is implemented, there will still be a shortfall for employees who receive above average increases in pay--generally, people who are promoted. The later in one's career that promotion occurs, the greater the gap in benefit delivery, since there are fewer years at the "promoted" salary level. The root of this problem is the inability to provide additional past service benefits under the defined contribution plan.

In general, all of the formula benefits which the paper identifies as being difficult to deliver under a defined contribution arrangement can be delivered by adjustment of past service benefits. This point is extremely important to our discussion, because it allows the sponsor to limit his financial risk by controlling benefit delivery through manipulation of past service benefits, while minimizing the benefit promise made for future service. A practical example is that inflationary increases are automatic under final pay plans, but discretionary where career average formulas with periodic updating are used. However, identical benefit delivery can be achieved under both plans.

The same logic suggests that ad hoc increases in retirement benefits may be preferable to automatic increases. Some commentators have suggested that private industry adopt automatic escalators before Congress mandates such coverage. Given the expense involved in automatic escalators of any significance, it seems highly unlikely that automatic escalators will ever be legislatively mandated; at the least, it would seem that a mandatory pension system would be a necessary prerequisite to such legislation.

To summarize, our inflation-conscious sponsor will tend to use a defined contribution program to provide basic benefits, to use a defined benefit plan only as a supplement to solve certain problems, and to deliver defined benefits by periodically adjusting benefits related to past service, while minimizing the benefit promise associated with future service. Of course, the consultant must adapt this general approach to the special needs of each client.

This philosophy is most closely met by the floor plan approach. Before 1976, the Internal Revenue Service did not allow qualified defined benefit programs to offset defined contribution benefits in the benefit formula, arguing that the resulting benefit was not definitely determinable. This position was reversed in Revenue Ruling 76-259.

A floor plan consists of a defined benefit and a defined contribution portion, each portion representing a separate qualified plan. The defined contribution portion operates as other defined contribution plans, although it typically includes a method for converting the account balance to a monthly annuity. The defined benefit portion includes a typical benefit formula. For a retiring or terminating employee, benefits under the formula are compared to the annuity generated by the defined contribution portion of the plan. If the annuity is larger, no benefits are payable from the defined benefit plan; if the annuity is smaller than the formula benefit, the defined benefit plan provides the difference. In other words, total benefit delivery for each employee will be the larger of the formula benefit and the account benefit.

Let us compare the floor plan approach to a defined benefit plan standing alone. If the two programs use an identical defined benefit formula, will the sponsor run identical financial risks under the two approaches?

Since ultimate real cost is a function of benefits plus expenses, the identical benefit promises reflect identical ultimate cost. In fact, since benefits under the defined contribution portion of the plan may exceed the formula benefits and will frequently vest more rapidly, the floor plan's ultimate cost probably is greater than the defined benefit formula standing alone. However, financial risk is also a function of incidence of cost. The floor plan provides considerably greater short term discretion over the incidence of cost than does the defined benefit approach. The range of contributions under the defined benefit plan is prescribed by ERISA and requires payment of normal cost plus an amortization payment on the unfunded accrued liability--20 to 40 year funding as a minimum, 10 year funding as a maximum. Since the minimum funding standard account operates on a cumulative basis, some increase in the range may develop over time if credit balances develop. It is clear, however, that the discretion available is considerably less than in the floor plan environment, where the defined contribution portion of the plan may receive employer contributions of between 0% and 15% of covered payroll in any year. While the defined benefit portion of the plan is subject to the ERISA requirements described above, this portion of the plan is expected to deliver only the difference between the formula benefit and the projected defined contribution benefit, and it is only this projected difference which must be funded according to ERISA constraints. When the sponsor raises or lowers the annual contribution to the defined contribution portion, there is a roughly offsetting decrease or increase in projected liabilities under the defined benefit portion. This change in liabilities is then spread over the appropriate funding period under the actuarial funding method in use. There is not an immediate offsetting effect on the defined benefit contribution level, allowing the sponsor considerable short-term discretion in terms of total annual contribution to the floor plan.

If we now tie the floor plan concept to a career average defined benefit formula with updating, we can design the defined benefit plan to produce no projected benefits after whatever period we choose, say 5 or 10 years. Through judicious use of updating, we can always deliver appropriate benefits for current retirees while keeping the promise of future benefits at a minimum.

Let us now return to the issue of termination benefits. While termination benefits are more costly under a defined contribution plan, there are some interesting reasons favoring the delivery of such benefits. Virtually all retirement programs favor older workers in their year-by-year benefit delivery, as these workers tend to have more years of service and to be more highly paid. However, the defined contribution plan allocates funds to employee accounts while the defined benefit plan promises an annual benefit deferred to some retirement date. Obviously, the deferral period is shorter for older workers, making the benefit promise more valuable to them. This difference in value widens rapidly as interest rates rise. At 2% interest, the promise of \$1 annually at age 65 is twice as valuable at age 55 as at age 25; at 6% the ratio is 6 to 1; at 10%, 19 to 1; at 16%, 94 to 1. Other factors, such as vesting, also increase the value of benefit promises to older workers.

This analysis demonstrates a significant characteristic of a floor plan in an inflationary environment. While ultimate benefit delivery at retirement may be equivalent to a defined benefit plan standing alone, benefit accrual is less adverse to younger employees. Consider the plan sponsor with a young workforce who wishes to prevent unionization. Assume that the union plan retirement benefit is \$10 times years of service. If the client adopts a floor program with a career average (with updating) defined benefit formula, it is easy to show the young employee that this is a superior arrangement. If he leaves, his termination benefit is larger; if he stays, the pay-related formula gives him some inflation protection.

One other aspect of these termination benefits relates to the social policy issue of adequate private retirement benefits. Under a defined benefit plan, rights are fixed at termination. Suppose all employers have final pay defined benefit plans with identical formulas. An employee who has several employers throughout his career is at a disadvantage, compared to an employee with one career employer, because his past service benefit is not updated with pay inflation. Obviously, the disadvantage increases with the rate of inflation. Frontloading of benefit formulas is only a partial solution to this problem.

Defined contribution benefits, on the other hand, are updated by interest accumulation. If all employers had identical defined contribution programs, and an employee is fully vested whenever he changes jobs, his total retirement benefit would be essentially unaffected by the number of employers during his career. Since the great majority of American workers have several employers during their lifetime, this analysis has significant implications concerning appropriate U.S. public policy toward defined benefit and defined contribution programs. In these inflationary times, sponsors should seriously consider the floor plan approach to retirement benefit delivery.

Once a plan design is selected, the ultimate cost has been established. The sponsor now faces the question of incidence of cost. Since no sponsor wants financial surprises, actuarial funding methods strive to establish a stable contribution pattern. Let us first consider funding methods, and

then consider assumptions. In particular, let us consider the uncertainties which may arise under present actuarial techniques, and then consider alternative techniques which will define or eliminate these uncertainties.

In the funding area, the range of deductible employer contributions must be computed under methods approved by the Internal Revenue Service. This does not mean that the sponsor is without flexibility. One alternative is to develop a contribution pattern based on the most realistic assumptions available, and then fit these results as closely as possible within an approved method. While it may be argued that development of two sets of numbers makes the valuation process more difficult, it is better to comply with the current tax code while not allowing compliance to unrealistically limit funding policy choices. Moreover, it seems more realistic to determine pension cost by estimating the future potential growth or contraction of the workforce, to consider expected future plan amendments, and to assume future cost-of-living increases in the current ERISA benefit maximum. This is especially true for the inflation-conscious sponsor, as each of these items (except contraction of the workforce) will increase projected liabilities.

Turning to the selection of individual assumptions, two approaches are commonly used--explicit assumptions, which require each assumption standing alone to be reasonable, and implicit assumptions, which require only that the assumptions in the aggregate produce a reasonable result. Available information suggests that the implicit approach is probably the dominant approach at the present time; it is certainly in widespread use.

While implicit assumptions are defined as those producing a reasonable contribution level in the aggregate when compared to explicit assumptions, rarely are implicit assumptions actually tested against explicit assumptions. Also, while implicit and explicit assumptions may produce similar current contribution levels, they will produce a different pattern of gains and losses. For example, suppose the assumptions are designed so that salary scale losses are offset by investment gains. Since the salary scale applies only to the working lifetime, while the interest assumption functions over the entire lifetime, salary scale losses will necessarily appear earlier than the investment gains in closed group methods. This suggests that while a particular set of implicit and explicit assumptions may prescribe identical current contribution levels, they will prescribe a different pattern of future contributions under a given set of closed group experience and therefore can never be fully comparable.

Implicit assumptions are often defended by one or more of the following arguments: (1) the inherent conservatism represents an appropriate margin for error; (2) explicit assumptions are overly influenced by current market conditions and therefore lead to frequent change and unstable contribution patterns; (3) a "realistic" salary scale would encourage higher wage demands from unions; and (4) implicit assumptions are widely accepted in the profession and therefore subject to limited criticism. In reviewing these reasons, a "margin of error" seems inconsistent with the spirit of ERISA's "best estimate" requirement. The ability to maintain an implicit interest rate assumption suggests that explicit interest rates can also be maintained in the face of current market fluctuations. In many cases, union wage demands are not an issue in setting assumptions, and the actuary's projections are likely to be given little or no credence at the bargaining table. Finally, the profession's wide acceptance of implicit assumptions in the past is only one factor to be considered in the discharge of one's professional duties.

To sum up, the inflation-conscious sponsor should be aware that implicit assumptions insert unnecessary confusion into an already uncertain process. At the same time, the financial uncertainties of inflation create doubt as to whether any one set of assumptions can truly be considered explicit. The sponsor may therefore be interested in projecting valuation results under a range of assumed future experience. This process will identify the relative sensitivity of the plan to the experience under each of the assumptions, which in turn may suggest design changes to minimize the potential impact of adverse experience.

In examining the individual assumptions used in the valuation process in relation to inflation, attention focuses on salary and interest assumptions. It is often said that over the long term, investment return will average 3 percentage points over inflation (representing real return) and salary increases will average between 0 and 2 percentage points over inflation (representing merit and productivity increases). This has led to the common practice of focusing on the spread between the salary and interest assumptions as a measure of their reasonableness.

The experience of recent years has brought the validity of these economic assumptions into serious question. Moreover, since the interest rate functions over the entire remaining lifetime of the employee population while the salary scale functions only over the remaining working lifetime, as a general working rule a 1% increase in the interest rate assumption requires a 2% increase in the salary scale to produce comparable contribution levels. Even assuming that the spread is an appropriate test for explicit assumptions, it follows that the spread is not an appropriate measure of implicit assumptions.

In summary, the development of individual valuation assumptions can respond to the realities of inflation within the framework of methods approved for tax deduction purposes. A more complete picture of the plan's financial condition will require valuation techniques which recognize future changes in the workforce, benefit level, ERISA benefit maximums, and analysis of the plan's sensitivity to adverse experience.

MR. ROBERT RYAN: An abundance of news articles have focused on the large unfunded liabilities that exist in some pension plans. Today, I would like to direct my comments to another set of plans--those that have either become or are in the process of becoming significantly over-funded. But before I discuss that situation, there are some general observations that should be made.

The establishment of a funding policy is primarily a management issue. As actuaries we can bring a great deal of information to assist a client in determining that policy, but he has the ultimate responsibility. The employer will be influenced by pension plan considerations as well as general business issues. For example, there might be concern about the attitude of lenders towards a corporation with significant unfunded liabilities. What are the company's cash flow requirements, both short and long term? The employer will consider the alternative uses of funds retained within the company versus contributing these funds to the plan. Also, pension funding policy should certainly be coordinated with corporate tax planning. These concerns are not unique during inflationary periods, but obviously inflation will influence an employer's thinking.

Ultimately, the bottom-line issue is profit. In most companies profit depends upon effective utilization of compensation dollars. To the extent that a company tries to maintain a reasonable balance between cash and deferred forms of compensation, funding policy can have a direct impact on proper compensation practices.

I have been fascinated with our concern for the incidence of pension cost, frequently expressing it as a uniform percent of payroll, when we allow other benefit programs to be funded on a pay-as-you-go basis.

Doesn't it seem inconsistent not to recognize the cost of post-retirement medical benefits and death benefits during an employee's working years; and why aren't those benefits funded in advance of retirement? Perhaps funding policy of the retirement program is really a subset of a much bigger issue, that being the funding of all employee benefit programs. On an even broader perspective, pension funding policy should be part of the total compensation policy of an employer. These issues may be extremely critical during inflationary periods when there is a high demand by employees for current cash compensation in lieu of deferred benefits. Typically, the employer's compensation objective is to attract and retain the best qualified personnel at a reasonable cost. Doesn't it seem logical that the funding policy of one specific benefit program should be structured in a way to be consistent with this objective?

But for now, I would like to concentrate on the pension funding issue. To do this, I have created a hypothetical engagement to assist a client in reviewing the funding progress of his pension plan.

Although the funding issue could be addressed immediately, it is preferable to establish the basis for this analysis. It may be necessary to review the corporation's benefit philosophy and objectives. This may disclose inconsistencies or conflicting goals that need to be resolved. Likewise, the design of the pension plan should be reviewed to assure consistency with the company's objectives. Given that there is agreement as to the purpose of the plan, then we can proceed to an analysis of the funding of that plan.

This hypothetical employer has a final pay plan. Actuarial valuations have been performed using the entry age normal cost method with supplemental liability, an 8% interest assumption and a 6.5% salary scale. The employer has the impression that if all of these actuarial assumptions were realized that cost would continue to be a uniform percent of covered payroll. The employer probably got this impression because his actuary said that normal cost is calculated as a uniform percentage of projected payroll. The actuary may or may not have mentioned that this contribution rate was based upon existing participants only and made no allowance for future entrants. And, by the way, benefits have been capped at current IRC Section 415 limits, an amount well below what we expect will be paid to some key executives.

Graph 1 demonstrates the fallacy of the employer's impression of uniform contributions. The forecast is based upon an open group valuation. The employer anticipated a slight growth in the workforce over the next twenty years, averaging about 1% per year. As you can see from the graph, there is a rather dramatic downward trend in plan cost over the next twenty years. In other words, there is significant advance funding taking place.

Another technique that can be used to demonstrate that the plan will become overfunded is to compare the ratio of plan assets to the liability of accrued benefits. As you can see in Graph 2, the present method is expected to increase this ratio rapidly. This again is in conflict with one of the employer's objectives, which was to keep the assets in excess of liabilities for accrued benefits, but only to a modest extent.

The actuary has several techniques available for assisting the client to better achieve his objectives. A change in assumptions might be appropriate. In our example, raising the actuarial interest above the present 8% level seemed inappropriate. This is certainly debatable. Another choice might be a change in the basis for determining the actuarial value of assets. Slower recognition of market losses could postpone contributions, but in our example this was not a material consideration. The change illustrated in the example is to adopt the projected unit credit cost method.

Actuaries seem preconditioned to expect a unit credit method to have a dramatically increasing cost pattern. That may be true for an individual or a closed group valuation. But when new entrants are included, this expected pattern is postponed for a considerable time period, perhaps not exceeding the entry age normal cost curve for 40 or more years.

The results of our example are demonstrated by the second line on each of the graphs. There is a significant reduction of approximately 1.25% in the level of contributions in the first plan year. Although the difference in contributions diminishes each year, the projected unit credit contribution remains below the entry age figure throughout the 20-year projection period. In the case of an employer with a large payroll, these differences represent a substantial change in cash flow. The second graph indicates that the change in method will slow the accumulation of assets; however, the ratio of assets to liabilities would still attain an ultimate level higher than what this employer would deem appropriate.

These graphs are based upon the assumption that all valuation assumptions are precisely realized in each year. In recent years, the rate of salary increases has far exceeded the rate of return on plan assets. The employer has expressed concern regarding this trend and its ramifications on funding if it continues. Forecast valuations have been prepared assuming that actual salary increases exceed the assumed level by 5% in each year for the next twenty years. The resulting actuarial losses are then funded over a 15-year period. Graph 3 indicates the projected level of contributions under both the entry age method as well as the projected unit credit. The significance here is how flat as a percent of payroll the required contributions are in each of the years of the projection. This holds true under either cost method. Thus, the client has some assurance that if recent experience were to continue in future years, (i.e., if rates of salary increase continue to be in excess of investment return), contributions as a percent of payroll would remain fairly uniform.

Looking at Graph 4, we see a projection of the funded ratio of the plan. Even under a pessimistic assumption of future salary increases in excess of investment earnings, we see that assets are projected to remain well in excess of liabilities for accrued benefits. This pattern is much more consistent with client objectives.

The purpose of these demonstrations is not to debate the merits of one cost method versus another, or any particular set of actuarial assumptions. It does show, however, how one might go about analyzing changes in actuarial methods or assumptions to help a client establish his funding policy.

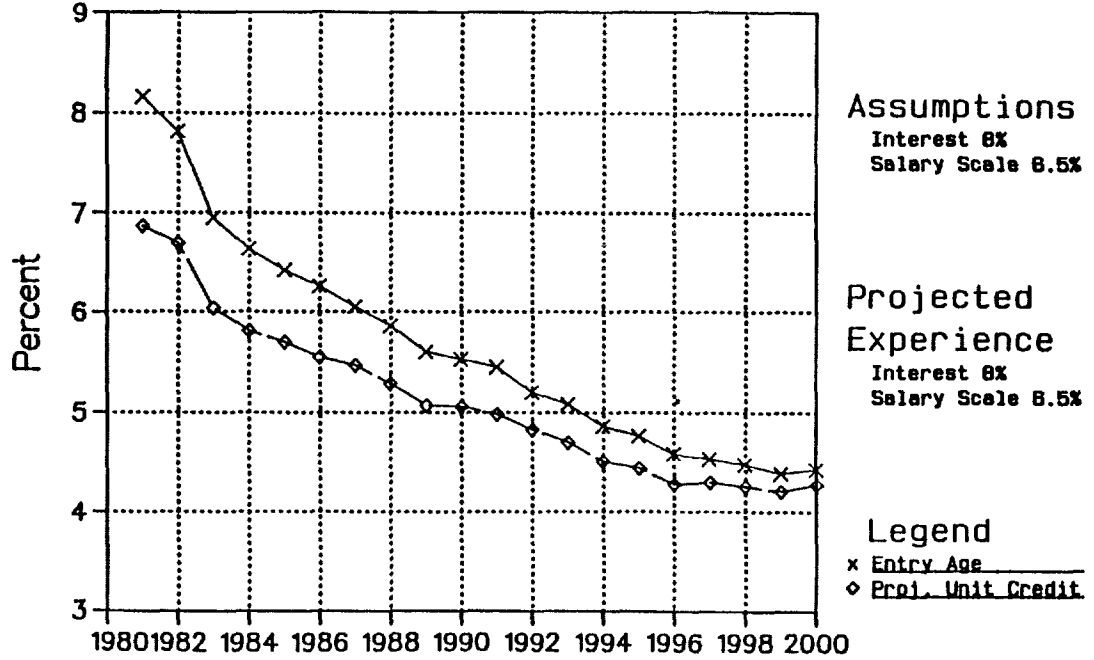
I stated earlier that it is difficult to separate the funding policy question from that of benefit design. During an inflationary period, an employer may be increasingly concerned about the commitment associated with a final pay plan. One approach that has been given increasing consideration is amending the plan to a career average formula. The intent would be that, through periodic updates of the measurement of career average earnings, the benefit formula could operate as a final pay plan, but management would have more control over its retirement plan commitment. If investment earnings are able to keep pace with inflation, then the cost of these periodic updates could, in part, be funded with excess investment earnings. Such an approach might be combined with a funding policy that requires contributions to be determined on a final pay basis. Of course, IRS maximum contribution limits must be carefully monitored.

Advance funding of pension obligations can lead to unusual situations. Many of you are familiar with a recent development in which a major employer has experienced severe operating losses for several consecutive years. The employer finds that as a result of prior overfunding the plan can be terminated, all accrued benefits fully funded, and a substantial amount of excess assets will remain. These excess assets can then revert to the employer, tax-free, to be used as a source of new funds to improve operations. In this specific situation, the employer has adopted a new pension plan which will provide benefits similar to that of the prior plan. However, now funds are available within the company to make the necessary contributions. Presumably, these will be timed in such a way so as to receive maximum tax benefit.

What can we conclude from all this? In an ideal situation, the funding policy of the pension plan will be part of an employer's compensation policy. The need for significant advance funding during an inflationary period may be questioned. Certainly if there is such a need, it will be the direct result of a stated set of objectives. And finally, the funding policy should be flexible enough to allow the employer to adapt to the dynamic influences of inflation; not only those that influence the pension plan, but also those that influence the operation of his business.

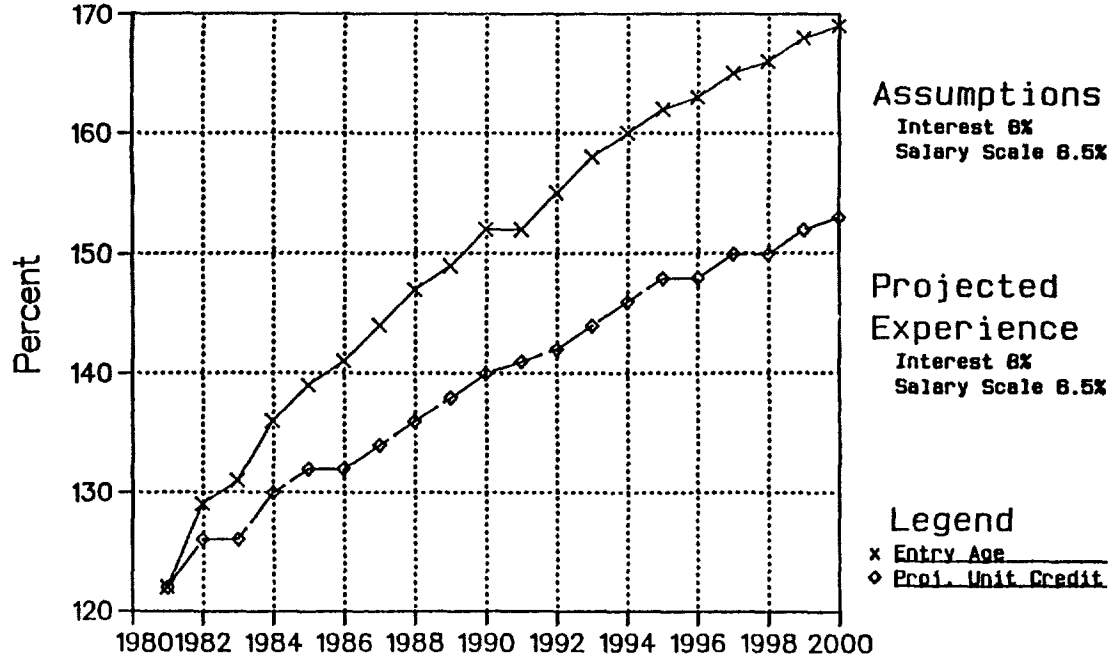
GRAPH 1

*Forecast of Contributions
(Expected)*



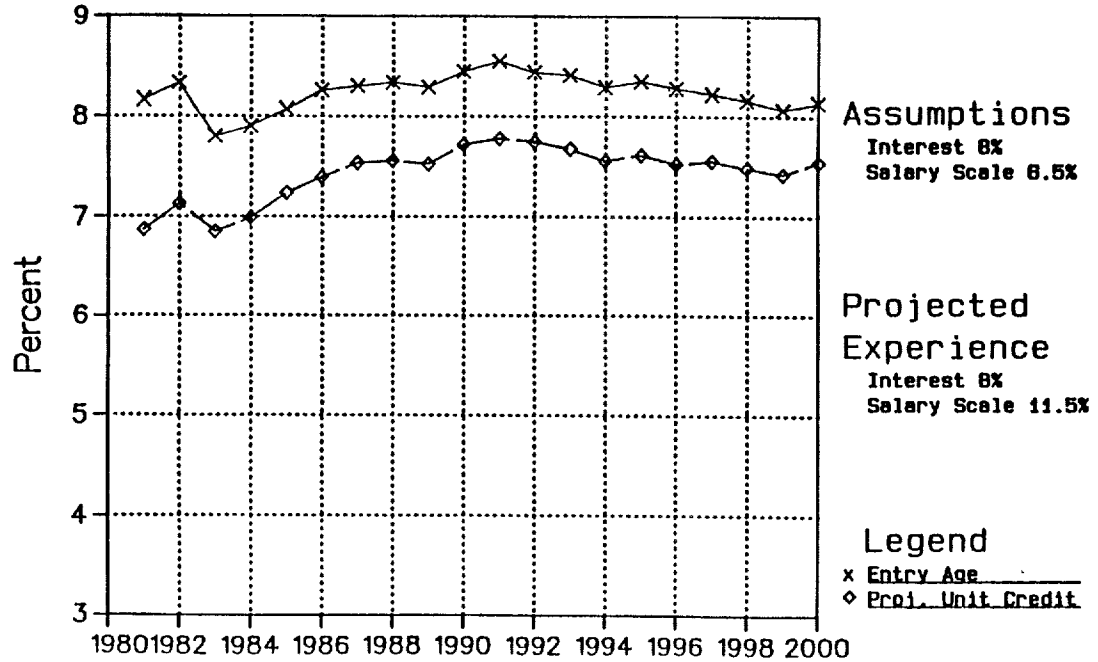
GRAPH 2

*Forecast of Funded Status
(Expected)*



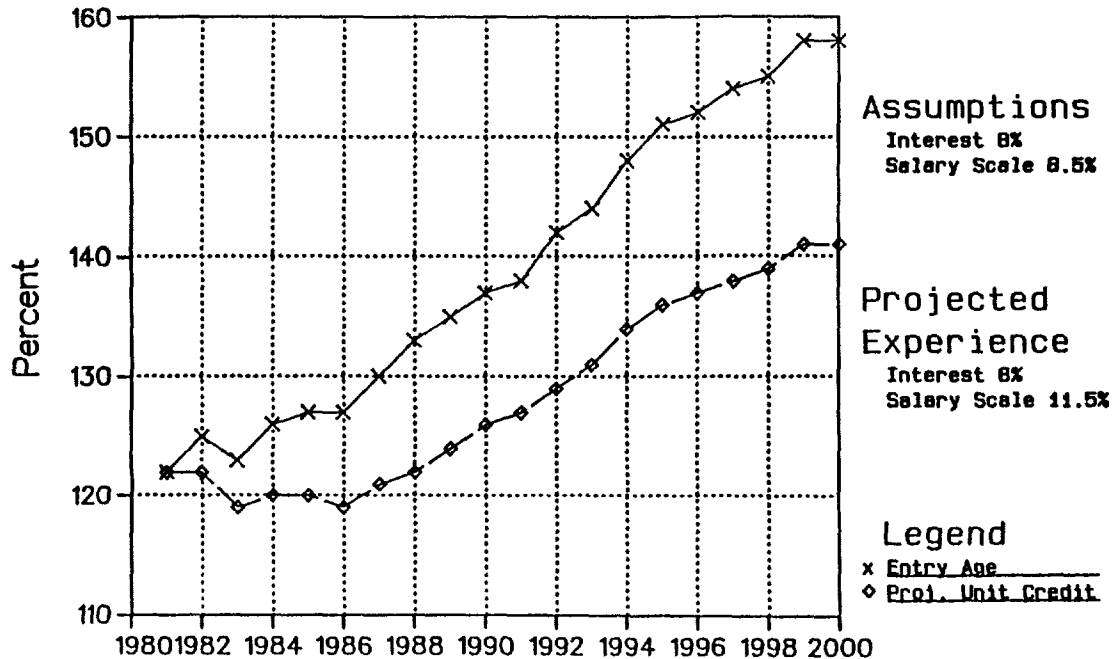
GRAPH 3

*Forecast of Contributions
(Inflationary)*



GRAPH 4

*Forecast of Funded Status
(Inflationary)*



MR. RONALD KARP: Following those serious presentations on pension plan design and pension funding, I would like to address the lighter subject of investment policy and investment planning, specifically, the role of real estate in a pension investment program. I think most of you have probably had some experience where there has been a need for investment vehicles that provide inflation protection. I think that both pension funds and insurance companies have been disappointed with the vehicles that they have used in the past for that purpose. What I would like to do today is to look specifically at real estate--both its historical performance and its likely future performance under different inflation scenarios.

I think that of the alternatives that have been proposed as an inflation hedge, real estate has received the most attention, probably for three reasons. First, and most important, real estate returns have been quite good over the last 5 to 10 years, the period for which we have the best data. Second, there is plenty of real estate available. Third, since most people own some real estate, they have some favorable recent experience with it in their own portfolio.

With that as background, let us look at the first slide (Table 1). There are four broad advantages of real estate investment: diversification, return, long-term character of real estate, and the control that can be exercised over real estate investment. Most of the attention has been focused upon return, since real estate has performed very well. I list diversification first intentionally because I think that is the most compelling reason for including real estate in a portfolio. Real estate has a very strong diversifying effect when added to an all-securities portfolio.

There are also some disadvantages to real estate investment (Table 2). One that has received the most attention is illiquidity. This is a very real disadvantage, although one that could be easily overcome by most pension funds by limiting the size of the commitment to real estate. A second disadvantage is lack of real estate information and data, both in terms of quantity as well as quality. We just do not know as much about real estate as we do about stocks, bonds, and cash. Finally, since real estate has provided very good returns over the last decade, this may be a sign of less favorable times to come. In fact, I think that there already has been some softening in several real estate markets, and some pension funds seem to be reducing the flow of new money to real estate.

Several studies have been done on real estate performance. While these studies have drawbacks, they all tend to examine the correlation of real estate returns with other investment returns. Clearly, if two investments are perfectly correlated, their correlation coefficient would be +1. That is, they always tend to move in the same direction from their average, by the same magnitude. Diversification would not be increased by combining these two investments together in a portfolio. By contrast, if two investments are perfectly negatively correlated (a correlation coefficient of -1), they will always move in opposite directions from their average, by the same magnitude. This is perfect diversification. Finally, two investments with a zero correlation coefficient have no tendency to act together or not to act together.

Table 3 shows the results of four studies conducted over different time periods during the post war period. There seems to be a modest negative correlation between real estate and stocks. In times when real estate is

doing better than average, there is a tendency for stocks to do worse than average. A conclusion to be drawn is that adding real estate to a portfolio provides much more diversification than adding additional securities. Furthermore, there appears to be little correlation between real estate and bonds. There is a slightly greater correlation between real estate and Treasury Bills because both are correlated with current inflation rates.

The next slide (Table 4) shows the returns of these studies, with the added study showing the aggregate results of pooled accounts used for pension fund investing. The properties examined in the first two studies are not really typical pension fund investments. The first considers farmland and residential real estate, while the second considers agricultural real estate. The third study considers more typical kinds of property that pension funds hold-- office buildings, industrial property, and retail or shopping center property. The fourth is devoted to industrial properties, and the fifth is all pooled pension fund money. The last three studies, then, are representative of pension fund experience in the real estate area.

One clear conclusion to be drawn from the last two studies, which analyze performance over the 1970's, is that over the last 10 years or so, real estate has been a more effective inflation hedge than stocks and bonds. Over the longer term, real estate has performed a little less favorably than bonds. If you accept variability as a measure of risk, then stocks would be the most risky investment, while both real estate and bonds exhibit substantially less volatility (Table 5).

Given this, I think that real estate, with a modestly lower return than common stocks, probably has performed as expected over the long-term. Real estate appears to have the characteristics of a lower-risk investment, with appropriately lower returns. In more recent years, we can say that it has performed as an inflation hedge, but we could have some long discussions about why common stocks have not performed similarly.

Obviously, from an analytical viewpoint, we are concerned with future inflation levels. This has led us to consider the way real estate properties are analyzed and to try to understand how real estate might perform in the future in different inflation environments. One of the things that I will discuss with you is the methodology that virtually all real estate advisors use to evaluate investments; the discounted cash flow analysis. Essentially, real estate advisors project the operating results of a property (revenues, expenses, etc.) over some period of time (e.g., 10 years). They also make an assumption as to the sale price of this property. This procedure allows the present value of the cash flow from that property to be compared with its present price to see if it should be bought, or alternatively, it allows the computation of the internal rate of return on the property.

In order to make a discounted cash flow analysis, we must start with some assumptions about the property. The sample assumptions we have used here are outlined in Table 6. The assumed basis on which the property will be bought is called, in real estate jargon, the capitalization rate. This is the rate of cash return that the property throws off. To say you bought something at an "8% cap rate" means that your cash return in the first year was 8%, and that is what we assumed for the purchase price.

Likewise, we have made an assumption about the basis on which the property would be sold at the end of the time period. For this analysis, we again used an 8% capitalization rate. We are assuming that inflation will continue at an 8% level during the period of this analysis. We also used the standard 5% vacancy rate assumption.

We had to make an assumption about revenue and expense growth. Here, there was a range of prevailing practice. Most people were willing to make the assumption that, over time, both revenues and expenses would track inflation reasonably closely. Some made the argument that this is too optimistic. Revenues may not keep up with inflation because new properties may be either locationally or technologically superior and that rentals may not keep pace due to competition from these properties. On the expense side, as a property ages, maintenance costs may increase. I have assumed that revenues will grow at 1% less than the rate of inflation, and expenses at the rate of 1% more. The initial operating ratio of 30% means that first year operating expenses are 30% of the gross revenues.

Table 7 shows a projection of the operations of a property, on the assumptions outlined in Table 6. The "Year One" column indicates that this property begins with gross revenues of \$1,000 (or net revenues of \$950 after a 5% allowance for vacancies), and operating expenses of \$300 (30% of the gross). This leaves a net operating income of \$650. Since we are assuming a cash purchase, there is no debt, leverage or mortgage, so the net is \$650. The rest of this projection runs out the revenues and expenses based on the assumptions outlined above. Revenues are growing at 7% and the expenses are growing at 9%. The initial value of this property is \$8,125, the amount that would have to be paid in order to make the \$650 with an 8% cash-on-cash return. There is a terminal value at the end of the 10th year of \$14,482, the value that would produce an 8% cash-on-cash return in year 11.

Table 8 shows the net cash flow to the pension fund. At time "0," the fund buys the property for \$8,125. In each succeeding year, the fund receives the operating cash flow, and in the final year receives both the operating cash flow and the sale value of the property. Based on these assumptions, the property would produce a 14% nominal rate of return, or a real return of 6%.

The next step is to repeat this exercise with varying inflation rates. Graph 1 shows how the return on this cash purchase of property varies with different inflation rates. On the vertical axis is the nominal rate of return and across the horizontal axis is the inflation rate. As expected, if we look up from the 8% inflation we find a 14% return.

The interesting result that emerges from the graph is that the real return from real estate appears to be relatively independent of the inflation rate. Although this conclusion depends on the assumptions that went into the model, we have tested enough alternative sets of assumptions to feel that this is a fairly robust conclusion. The critical assumption here is the one determining terminal value, the sale price of the property at the end of the 10th year. We tried that on a variety of bases, with higher cap rates, lower cap rates, on the basis of assuming you sell the property at such a price that the then buyer will get a real return of 5%. On all these assumptions, the real return line stayed fairly horizontal. Irrespective of inflation, real estate appears to offer a reasonable real return over the long-run. I think that was a fairly significant conclusion of this part of the project.

One other general area I would like to cover is the alternative forms of purchasing real estate. What we have illustrated here is the "all cash" purchase, or outright ownership. Currently, 90% to 95% of the pension fund assets invested in real estate are in this form. About 80% of the new money continues to be invested in pure equity real estate.

The first alternative real estate vehicles that I would like to discuss are the equity mortgage investment forms. These are instruments for owning real estate that have really come into being within the last few years. They are a product of current market condition in two respects. First, interest rates are at such a high level that the commercial real estate property can not support those interest rates. Even if straight mortgage money was available, debt service is a significant deterrent to taking a traditional mortgage. At the same time, the traditional lender in this long-term mortgage market, the life insurance companies, have had much less cash flow to invest in long-term mortgages. Those two factors together have combined essentially to eliminate the long-term fixed rate mortgage in commercial lending.

We have had a development in this country very similar to the European experience, where the mortgage market has disappeared and where the whole structure of the real estate industry has changed. Institutional investors have become participants in the whole real estate development process. They have become, if not partners from the very beginning, partners after construction. I call this an evolution from equity kickers, but the instruments are really very different from what we used to know as equity kickers, which received some prominence in the past tight money period.

In those past tight money periods, the kicker, paid in addition to the fixed rate of return, might have been 5% or 10% of profits or revenue. While the form of the instrument may be the same today, the numbers have changed dramatically. Today, we are talking about participation from the money partner on the order of 50% to 65%, or even as much as 80% or 90%. There are two basic forms: (1) a participating mortgage, where there would be a fixed rate plus a participation in both profits and appreciation and (2) a convertible mortgage, where there would be the participation and at some point in the future the ability to convert into the property itself. What has made them very attractive vehicles is that since pension funds are not in a position to utilize the tax shelter, the agreement can be structured so that the developer (taxable partner of pension fund) can utilize these tax benefits. For years, such tax considerations have been put forth as a reason why pension plans should not be in pure equity real estate. Accordingly, what has happened in the negotiating process is that part of the benefits of that tax shelter has flowed back to the pension fund investor. In other words, it is an indirect way for the pension fund to participate in the tax shelter that real estate offers.

Typical terms on a participating mortgage might be something like a 12% fixed return and 50% of the operating profits after that, as well as 50% of the appreciation of the property. The pension fund would put up 75% of the value of the property. Typical terms on a convertible mortgage might call for the pension fund to put up 85% of the value of property, in exchange for a fixed return of 10%, plus an 85% conversion privilege. Thus, in essence the pension fund receives 85% of the appreciation as well.

The way that this participation in the utilization of tax benefits appears can be seen on Graphs 3 and 4, which compare the returns on the participating and convertible mortgages to that for the all-cash line. The mortgage instruments offer a higher return, and the spread between the cash line and the mortgage line is something like the value of the depreciation times one half for the tax bracket times one half for the split with the partner. Also, on the down side, the mortgage vehicles give even greater protection because they have the fixed return component. I believe that in the future, these equity arrangements will tend to become the predominant way in which pension funds will invest in real estate.

One other point I will make about these vehicles relates to insurance companies. Insurance companies have been looking for inflation hedging types of investments, and real estate is something that they are quite familiar with, although statutory requirements preclude their putting significant amounts of money in equity type investments. I think these mortgage vehicles are a very meaningful solution in that area, because while they go under the title of mortgages, and they have the safety that is associated with mortgages, they are really equities and provide the same kind of inflation hedge that an equity does.

TABLE 1

ADVANTAGES OF REAL ESTATE INVESTMENT

DIVERSIFICATION

Low or negative correlation with other asset classes
Impact on total portfolio

RETURNS

Inflation hedge
Competitive yields versus comparable risk investments
Low volatility

LONG-TERM CHARACTER

Matches pension fund time horizon

CONTROL

“Real” asset independent of market psychology
Management can impact

TABLE 2

DISADVANTAGES OF REAL ESTATE INVESTMENT

INVESTMENT CHARACTERISTICS

- Illiquidity
- Management intensiveness
- Can't compete with taxable investors

INFORMATION VOID

- Lack of reliable historic information
- Difficulty in measuring performance
- Inability to define high quality investments
- View of real estate investment as "mystery" with inordinately high risk

CURRENT PRICE LEVELS

- Boom and bust cycle
- Gains in real estate already made
- Deflation or disinflation would hurt real estate returns

PANEL DISCUSSION

TABLE 3

DIVERSIFICATION EFFECT
REAL ESTATE COMPARED TO STOCKS AND BONDS
 (FOUR STUDIES*)

CORRELATION OF REAL ESTATE RETURNS WITH:

		STOCKS	BONDS	TREASURY BILLS
I	(1947-78)	-.231	.062	.604
II	(1949-69)	-.13	-.26	N.A.
III	(1951-78)	-.18	.08	.64
IV	(1973-78)	-.07	-.31	.28

* I Ibbotson & Fall, Journal of Portfolio management, 1978.

II Robichek, Cohen & Pringle, Journal of Business, July 1972.

III McMahan Associates Report, 1980.

IV Hoag, Journal of Finance, May 1980.

COMPARATIVE RETURNS

REAL ESTATE COMPARED TO STOCKS AND BONDS (FIVE STUDIES*)

	ANNUALIZED TOTAL RETURN			
	REAL ESTATE	STOCKS	BONDS	CPI ANNUAL INCREASE
I (1947-78)	8.1%	10.3%	2.2%	3.7%
II (1949-69)	9.5	11.6	2.0	2.2
III (1951-78)	13.9	11.4	3.4	3.6
IV (1973-78)	14.3	3.6	6.6	8.1
V (1972-80)	11.3	7.0	3.1	8.5

PANEL DISCUSSION

- * I Ibbotson & Fall, *Journal of Portfolio Management*, 1978.
- II Robichek, Cohen & Pringle, *Journal of Business*, July 1972.
- III McMahan Associates Report, 1980.
- IV Hoag, *Journal of Finance*, May 1980.
- V Karp Associates Report, 1981.

TABLE 5

COMPARATIVE RISK
REAL ESTATE COMPARED TO STOCKS AND BONDS
(FOUR STUDIES*)

	STANDARD DEVIATION OF RETURNS		
	REAL ESTATE	STOCKS	BONDS
I (1947-78)	3.5%	18.0%	6.7%
II (1949-69)	4.5	17.6	3.4
III (1951-78)	3.8	18.3	6.6
IV (1973-78)**	8.6	10.4	4.0

* I Ibbotson & Fall, Journal of Portfolio Management, 1978.

II Robichek, Cohen & Pringle, Journal of Business, July 1972.

III McMahan Associates Report, 1980.

IV Hoag, Journal of Finance, May 1980.

**Quarterly Data

ALL CASH PURCHASE

PROPERTY ASSUMPTIONS:

INITIAL VALUE	TERMINAL VALUE	INFLATION	VACANCY RATE
8% CAP	8% CAP	.08	.05

REVENUE GROWTH	EXPENSE GROWTH	INITIAL OPERATING RATIO
1 - 1%	1 + 1%	.3

TABLE 7

OPERATING RESULTS:

YEAR	1	2	3	4	5
GROSS REVS	1000.00	1070.00	1144.90	1225.04	1310.80
VACANCY	50.00	53.50	57.25	61.25	65.54
NET REVS	950.00	1016.50	1087.66	1163.79	1245.26
EXPENSES	300.00	327.00	356.43	388.51	423.47
NET OPER INC	650.00	689.50	731.23	775.28	821.78
DEBT SVC	0.00	0.00	0.00	0.00	0.00
NET AFTER D/S	650.00	689.50	731.23	775.28	821.78
YEAR	6	7	8	9	10
GROSS REVS	1402.55	1500.73	1605.78	1718.19	1838.46
VACANCY	70.13	75.04	80.29	85.91	91.92
NET REVS	1332.42	1425.69	1525.49	1632.28	1746.54
EXPENSES	461.59	503.13	548.41	597.77	651.57
NET OPER INC	870.84	922.56	977.08	1034.51	1094.97
DEBT SVC	0.00	0.00	0.00	0.00	0.00
NET AFTER D/S	870.84	922.56	977.08	1034.51	1094.97

Initial Property Value: \$8,125

Terminal Property Value: \$14,482

TABLE 8

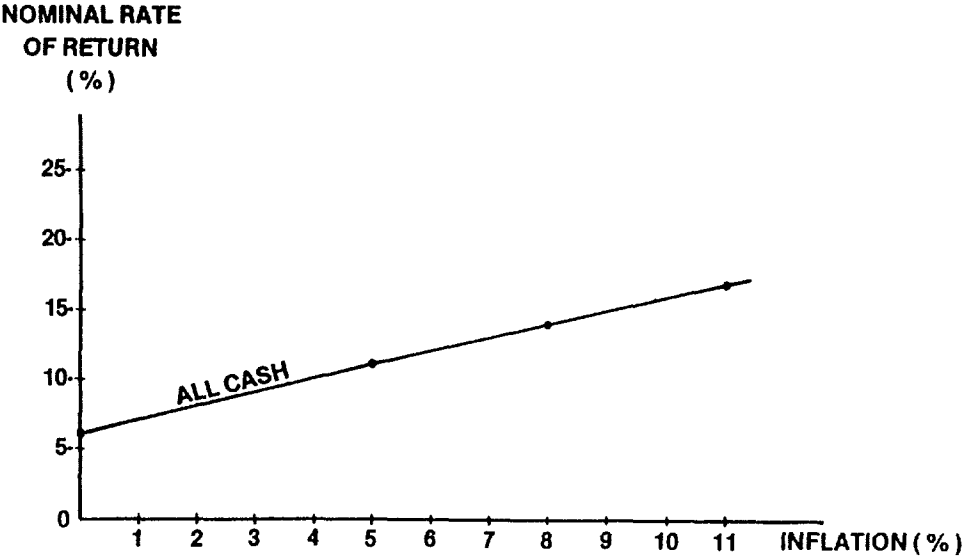
PENSION FUND CASH FLOW AND RETURN

YEAR	0	1	2	3	4	5
	-8,125	650	689.50	731.23	775.28	821.78
YEAR		6	7	8	9	10
		870.84	922.56	977.08	1,034.51	15,577.28

**10-YEAR RATE OF RETURN: 14.00% (Nominal)
6.00% (Real)**

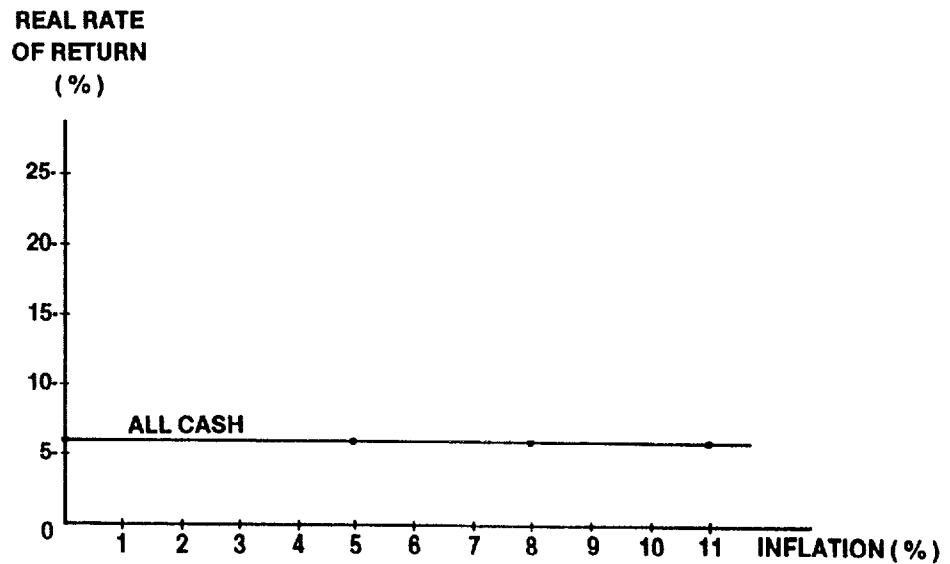
GRAPH 1

EFFECT OF VARYING INFLATION RATE ON NOMINAL RATES OF RETURN



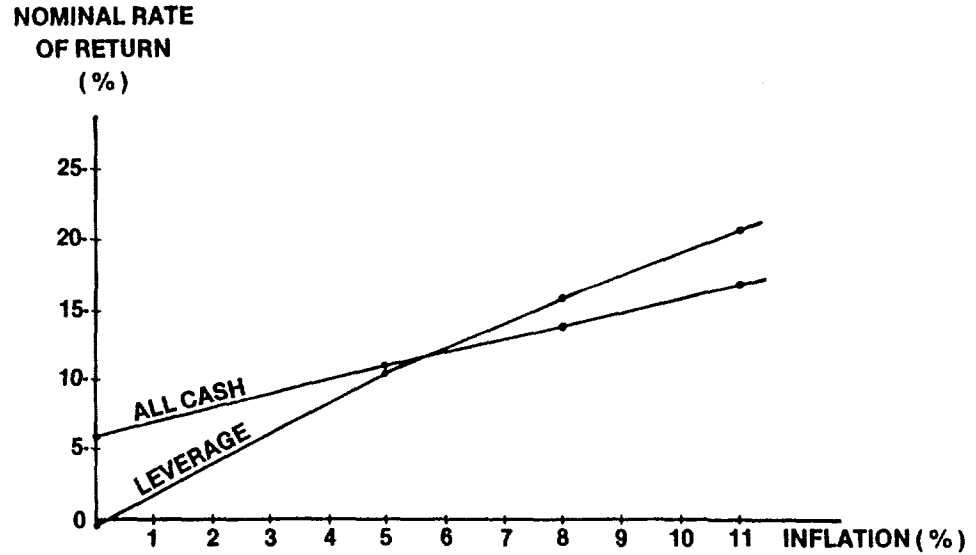
GRAPH 2

EFFECT OF VARYING INFLATION RATE ON REAL RATES OF RETURN

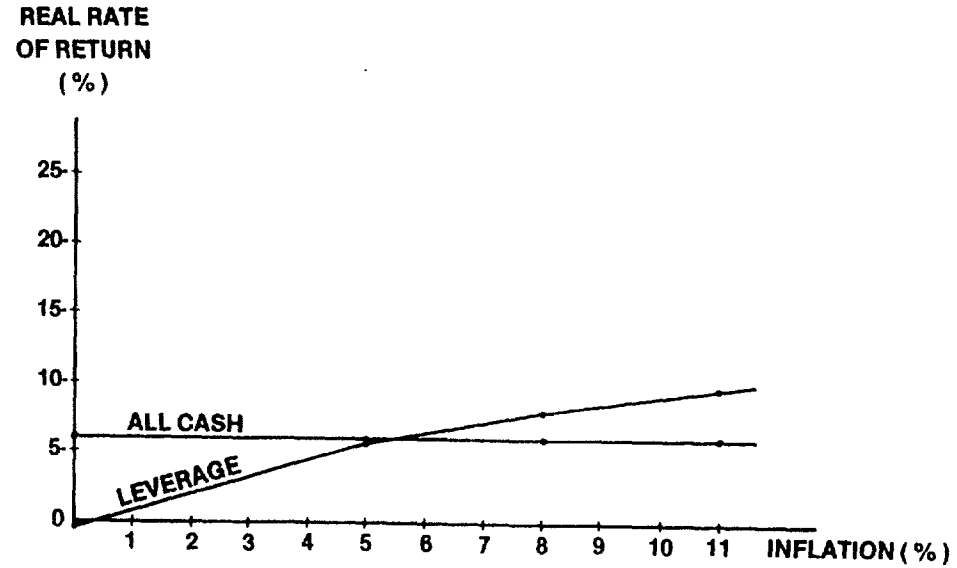


GRAPH 3

EFFECT OF VARYING INFLATION RATE ON NOMINAL RATES OF RETURN



EFFECT OF VARYING INFLATION RATE ON REAL RATES OF RETURN



MR. IRWIN TEPPER: Three or four years ago, there was a cover story in Business Week, "Inflation is Wrecking the Private Pension System." As I remember that article, it was rather dismal. It stated that retirees were in terrible straits because inflation was eroding the purchasing power of their benefits. Moreover, while liabilities were escalating with inflation (mostly on the active side), pension assets did not seem to be keeping up with inflation. Thus, you have an impossible situation in which the beneficiaries were suffering due to inadequate benefits and corporate sponsors were having trouble keeping up with these benefits. The demise of the private pension system seemed to be inevitable.

Here we are several years later, and yet the forecasts of that cover story do not seem to be coming true. We should ask "why?" I think that when you reflect on that Business Week article, the challenges posed for the pension fund financial planner in an inflationary environment are basically two: (1) how to design pension systems that provide adequate benefits (indexed pensions), and (2) how to find investments which will be an inflation hedge and thereby provide real returns and preserve the real value of pension assets.

Let me consider the first challenge, the presumption that retirees need indexed private pensions of either an adhoc or formal nature. It is absolutely true that inflation has eroded the purchasing power of private pensions. In fact, I think most of you know from your own practice that every major corporation has heard from its retiree group on this matter.

One of my clients wanted to do a study of its 1200 retirees to see if there was a problem. We looked at the purchasing power erosion that had taken place for each of these 1200 people since the date of retirement. We examined both private pensions, as well as Social Security. Much to my surprise, more than 80% of those people had a cumulative erosion of less than 10% in purchasing power since the time of retirement. Some retirees even had an increase in purchasing power.

The reasons for this are the Social Security amendments of the 1970's. The first one was done incorrectly in 1972, resulting in double-indexing. Although this was corrected in 1977, we still have a system where the Social Security component of the total retirement package is over-indexed. Hence, the typical retiree receiving both a private pension and Social Security has not done so badly.

You might ask about the other 20% of retirees who had greater than 10% erosion. As you might expect, it turns out to be the people who retired at relatively high salary levels and had a fair amount of personal savings. Thus, the people that were hurt by purchasing power erosion were the people that could most afford it.

Since I finished the study, I have looked for similar studies. I wondered whether this conclusion was just a quirk of the particular group studied, or whether the conclusion was generally true. TPF&C has published a report which has received much praise and reaches the same conclusion. But the story doesn't stop there. First of all, in my study I deflated retirement income by the CPI, before I learned that was the wrong index to use. The CPI is not only the wrong index to use just for retirees, it is the wrong index for all of us. Since it overweights the cost of housing, when you take a look at the CPI index in relation to other reasonable indices, you discover that in the middle 1970's they start diverging. The CPI has not been a true indicator of the cost of living, and using the CPI to measure purchasing power loss overstates the loss. In particular, since Social Security benefits are linked to the CPI, these benefits have been over-indexed. Be careful when you use the CPI, as the actuarial framework is very conservative (overstates cost).

As I continue to look around for other data to support my hypothesis that retirees have not done so badly, I came across other work which went further than just looking at the package of Social Security and private pensions, but looked at the total income picture of retirees, including such items as Medicare, Medicaid, home ownership, bank accounts, and other sources of income. Many studies done from retirement history surveys show that the private or government pension components of either income or wealth, however you choose to measure it, is only 10-15% of the total package. Social Security is around 30-35%, Medicaid is about 10-15%, and housing 10-20%. In terms of the total components of income and wealth of the retirees, the private pension component is really quite small. I am not going to suggest that this will continue. With the benefit liberalizations that have taken place with the private pension system, we certainly expect the pension component to grow. But for current retirees it is a small component.

My conclusion of this first part of my discussion about retirees and how they fare is that I do not believe that they have done as badly as is generally believed. In fact, it is worth noting that the New York Times (11/18/81) published the results of a poll which asked the following question: "Are the finances of people over 65 a very serious problem to them?" The question was posed to two groups, one group under 65, and the other group over 65. While 68% of the people under 65 thought it was a serious problem for people over 65, only 17% of the people over 65 thought it was a serious problem. Retirees seem to realize that the situation is not as bad as people might think. For all of these reasons, I do not believe that we will see a proliferation of indexed pensions in private systems. I believe, however, that we may see some alternatives given to retirees to select different annuity forms to protect purchasing power at an equivalent actuarial reduction. I doubt that very many retirees are going to elect such optional annuity forms, as the reduction is going to be very large at age 65.

Another policy area where I expect to see continued activity is the development of investment vehicles intended to match the purchasing power promise that some companies might offer to retirees. Mr. Karp has built a reasonably good case that real estate has been a good inflation hedge. However, I think that if you look at almost any time period, Treasury Bills have been an even better inflation hedge. Yet, I do not see very many plan sponsors with large holdings of Treasury Bills. Modern portfolio theorists have measured real returns and have inundated plan sponsors with evidence that Treasury Bills are the best hedge against inflation. This leads to the second challenge of the Business Week article; the need for effective inflation hedges.

Take a look at the liability structure of a typical pension plan. Let us consider the characteristics of the inactive liabilities. They are fixed in nominal terms, unless we choose to recontract and give some form of cost of living adjustment. The liabilities that we might be worried about on the inflation front are the active liabilities, both in the salary and hourly plans, since we know that through future pay and benefit increases, that inflation will ultimately find its way into benefit formulas. Let us look at how the plan sponsor has fared in the recent inflationary environment with respect to those two classes of liabilities. If retirees have had the real value of their private pension reduced by inflation, it must be that there is a winner. It is the corporate sponsor. In fact, the present value of these future benefit streams is considerably lower today than it has been. Although interest rates are much higher now as a result of higher inflation, most of us do not report pension liabilities using true market rates. Hence, disclosure calculations fail to show how good things are.

One of my clients had his actuary develop a new set of assumptions, and the actuary chose a 4% inflation assumption, instead of something higher, in order to be conservative. That led to a discussion of how it could be in a pension system that a lower inflation assumption, keeping the spreads constant, is conservative. We all know how both these factors apply to the active period, but only the interest rate assumption applies to the post-retirement period. I suggest that companies have realized a big windfall gain due to inflation on the post-retirement liability. Thus, the only liabilities that we must worry about are the liabilities for the actives.

Any plan sponsor promising benefits based upon pay and negotiated increases would be in a very good position if he had an inflation-indexed asset to match these inflation-indexed liabilities. In fact, I think the sponsor should have an inflation-indexed asset. The question I want to ask you is: "Must that asset be in the corporate pension fund?"

I would like you to imagine an actuarial report, containing the actuarial balance sheet, showing pension assets and liabilities. I want you to imagine taking that balance sheet for the pension plan and adding it to the company balance sheet to create an augmented balance sheet. Now I want to ask the following question: "How does the company get the resources to meet its liabilities?" In other words, what generates the money to pay the wages and to make contributions to employee benefit plans? I would argue that the asset base which ultimately supports indexed liabilities is the corporate physical capital.

Indeed, I have some historical data to support the hypothesis that real corporate physical capital must be capable of keeping up with inflation and providing real rates of return over long periods. Let me ask you the following question: "Suppose it didn't?" Suppose that the experience we had in the mid to early 1970's continued. Question: "Who would ever commit capital to companies that could never earn a positive real rate of return?" It just can not happen over long time periods. Over the long run, management somehow must find a way to adjust prices, wages and employee benefits, to ensure that real rates of return are earned by owners of capital. It has to be, or else we do not have our system of voluntary capital allocation to corporate America.

Now it is true that anyone can pick a selected five, six or eight year period to show that what I am hypothesizing has not been true. I submit that for longer time periods, if you look at corporate profitability, it has been true. But where did the problems arise? Problems arise over short periods in corporate history, where the rate of inflation changes either up or down, and some adjustments must be made. For a time, corporate financial results may be poor, but they cannot continue to be so. I submit to you again that it is the real physical capital in corporations that supports pension liabilities on an inflation-indexed basis.

Let us take this augmented balance sheet, or this link between company and the pension finances a bit further. If we agree that corporate assets are the natural inflation hedges matching pension liabilities, let me ask you the following question: "What liabilities in the corporate financial structure now need to be hedged by pension assets?" I would argue that they are the fixed dollar denominated liabilities: The inactive pension liabilities and the corporate debt on the corporate balance sheet. This is where corporate America is unhedged, and for good reason.

Corporate issuers of debt have been winners over the post war period. If you examine the return on corporate capital for reasonably long periods of time, you do indeed find that there has been some disruption in the long-run equilibrium process described above. While the return on corporate capital has been declining, the return on equity has not. Now if the return on aggregate corporate assets has been declining, and yet equity holders seem to have done all right, there can only be one class of losers, the creditors holding fixed-dollar liabilities.

Now are we willing to believe that corporations can continue to issue debt carrying low yields? In other words, are we willing to believe that corporations can continue to gain at the expense of inactive pensioners and creditors? I submit to you that the answer is "no." We are currently going through a period of disinflation, and any sensible businessman desiring to hedge fixed-dollar liabilities would put assets into bonds.

Do I have any evidence that such activity is taking place? Yes, I do. In the April 5 issue of Business Week there is an article entitled "Learning to Live with Disinflation." The article describes how profits are being squeezed and balance sheets are being weakened as prices level off. It also describes how wages, which previously have been negotiated anticipating higher inflation, are still going up at that rate while the product prices are going down. It discusses how debt, which was taken on in a higher inflation environment at higher interest rates, is not becoming a real burden to corporate America. Five years ago I was told that inflation was bad for business. Can both points of view be correct?

I reread the article a little more carefully and found a clue to what is happening at the end of the text. The problems associated with disinflation are real; price level adjustments could be accommodated if physical volume were not declining. I believe that inflation is not the problem. I believe that the major problem for corporate America, as well as for those people responsible for pension plan financial planning, is declining real growth, declining productivity and rising real rates of interest. I submit to you that these are the most important economic phenomena to consider as pension fund planners.

Let me summarize my remarks:

1. Lack of indexing of private pensions is not a serious problem.
2. Sponsors need not add inflation hedges to pension portfolios.
3. Real factors in the economy should be the major concern of pension fund financial planners, not inflation.

You should be suspicious about what I just told you. What I have described is a long-run equilibrium way of looking at the pension problem. However, we seldom see equilibrium situations in our day-to-day dealings with clients. Instead, what we see are the fluctuations and deviations from the long-run equilibrium trend, and indeed that is what most of us try to help clients manage.

To conclude, I hope that, whether or not you accept my conclusions, you will reconsider the framework within which you analyze long-term planning problems. I hope that you will begin to think more in terms of the economic linkages between the pension plan and the corporate sponsor. Both beneficiaries and sponsors have a great deal at stake.

