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## CHOOSING ECONOMIC ASSUMPTIONS FOR PENSION PLANS

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*Panelists: JAMES R. SWENSON, JEFF FURNISH, HENRY BRIGHT*

1. How should an Inflation Assumption be chosen?
2. Who should and can be involved in the process?
3. What Economic Assumptions are used for Social Security (Canadian and U.S.) projections?
4. What is the future of productivity and general wage increases?
5. How are Turnover and Retirement Age Assumptions related to Economic Assumptions?
6. Are actuaries using variable or indexed Economic Assumptions? How are they doing it?
7. Should Economic Assumptions vary by plan size? By benefits design? By valuation method? By investment strategy?
8. How should the assumptions be communicated to the plan sponsor?

MS. KAREN MITCHELL: The choosing of economic assumptions for pension plans is a topic which has become more frequently discussed as the general economics situation has become more notable.

I am sure that if any of the members of this panel had a cookbook recipe - preferably infallible - for choosing assumptions which would always turn out "right" in the long run for the purpose intended, we would be at home sharing this information with our colleagues and clients.

Since we don't have a recipe for you, we will discuss considerations involved in the selection of economic assumption, consider how the economic assumptions relate to other techniques actuaries use, take a short look at the situation from the Canadian perspective, and look at some current issues.

To do all of this we have a panel of three actuaries experienced in pension consulting. Jim Swenson is employed by Prudential Insurance Company. His current assignment involves providing actuarial consulting services to some pension plans that use Prudential's group pension products for funding purposes. The plans on which he works exhibit a wide variety of benefit formulas and include both single employer and multi-employer plans.

Jeff Furnish is the senior actuary in Portland, Oregon for Johnson and Higgins. Jeff is also an attorney, and before he had his current position, he was senior counsel in the Wyatt Company office in Washington.

Henry Bright is with the Wyatt Company in New York. He heads up a consulting and actuarial team that serves a group of large and medium sized clients

including some which have fully indexed pension plans. Prior to joining the Wyatt Company, Henry worked for Excelsior Life in Toronto, Canada, and still serves some Canadian pension plans.

MR. JAMES R. SWENSON: It is important that appropriate economic assumptions be chosen as those assumptions can have a very dramatic effect on current funding levels. The inflation assumption is the "cornerstone" of the economic assumptions as it influences a number of significant assumptions.

The selection of a proper inflation assumption must recognize the fact that the time horizon for a typical pension actuarial valuation is very long term. While current rates of inflation cannot be ignored, a long term perspective is required.

A review of the 200 year history of inflation in the United States reveals that there have been periods of time when inflation rates have been as high as those currently prevailing. Generally, those high rates of inflation have been associated with the financing of war efforts. Some economists have expressed the opinion that the current high rates of inflation in the U.S. can be largely attributed to the decision to finance the military efforts in Vietnam and the "war on poverty" at the same time.

The history of inflation in the United States also reveals that there have been long periods of actual deflation. Further, during periods of peacetime inflation, the inflation rates were typically below 5%.

A review of a thousand year history of world inflation also proves very interesting. There are long periods during which there was essentially no inflation. However, there have been four lengthy periods during which inflation surged. During these four periods, the long term rate of inflation did not exceed an annual rate of 3%.

None of us can accurately predict the future rates of inflation in the United States. Hopefully, we will be able to successfully control inflation as has been the experience of countries such as West Germany. It is worth noting that where governments have allowed inflation to get out of hand, those governments have typically met with some form of discontinuity.

While I do not predict a discontinuity for our government, it is encouraging that the stimulative spending and tax policies advocated by Keynesian economics are now being seriously challenged, not only by business, but also in our colleges and universities. Unfortunately, Congress seems largely unaware of this revolution in economic thinking.

I do not personally predict any major reduction in inflation rates during the next several years. However, because of the need for conservatism, as will be discussed later, and because of the longer term history of rates of inflation in both the U.S. and the world, a significant reduction in inflation rates should be assumed for the term associated with the long time period covered by a pension actuarial valuation.

Another factor to consider when selecting an inflation assumption is recognition of currently prevailing actuarial practice. I am not suggesting that we all follow each other as lemmings rushing to the sea. However, it does become difficult to justify assumptions that are significantly out of the mainstream of current practice.

After considering the long term history of inflation, the uncertainty of the future, the need for conservatism and current actuarial practice, a long term inflation assumption of 3% has been selected as appropriate for valuing many of our pension plans. When selected, this rate of inflation is consistently applied throughout all of the economic assumptions.

For example, the investment return assumption includes the long term inflation assumption of 3%. An assumed "real rate" of return of an additional 3% is then generally added to the inflation assumption to produce an investment yield assumption of 6%. The 3% "real return" assumption is consistent with the long term studies conducted by the University of Chicago taking into account the typical mix of pension plan assets.

This "real return" assumption may be challenged as being overly optimistic. As pointed out by the controversial Fortune magazine article, the yields of pension plan assets have not kept pace with inflation during the past decade. While this is true for many plans, the reason is related to the fact that inflation rates have increased substantially during this period. If inflation rates had remained relatively stable, it is likely that a significant real return would have been achieved. The major problem of the past decade is not necessarily the level of inflation, but the fact that inflation rates have increased substantially and such increases were not predicted by investors.

The salary scales we use include the same 3% inflation assumption. In addition, 1% is added to the inflation assumption to reflect productivity growth. This envisions a return to economic conditions where wage increases exceed inflation.

This approach, which recognizes both inflation and productivity growth, is fairly common actuarial practice. However, our salary scales for salaried employees typically include a third factor that recognizes the maturation of the employee.

It is typical for salaried employees to receive salary increases that reflect length of service. In addition, promotions are rewarded with salary increases. Therefore, we include a third factor in our salary scales to recognize salary progression by age. The amounts added at the younger ages are very significant and they grade downward as age increases. The net result of this three factor approach recognizing inflation, productivity growth and maturation is that the salary scale assumption exceeds the investment yield assumption for a large portion of the participants.

The selection of an appropriate factor to reflect maturation substantially depends on the nature of employment and the philosophy of the employer. Therefore, the employer should be consulted on this matter. Actuarial studies of salary progression by age could also be made.

The economic assumptions employed for Social Security projections are consistent with the other economic assumptions. We forecast Social Security benefits using the basics of the 1977 Act. The CPI is assumed to grow at 3%.

The average wage is assumed to grow at 4%, reflecting the same 1% productivity assumption included in the salary scale assumption. The salary of the individual is assumed to grow at the rates assumed in the salary scale.

Although turnover and retirement patterns are undoubtedly affected by the

economic environment, the relationship of the turnover and retirement age assumptionsto the economic assumptions is uncertain. During periods of economic hardship, there are usually two forces at work. The employer with falling profits will want to reduce the work force and may encourage employees to terminate, one way or another. The employees, however, encounter a tight job market or face a fixed pension with eroding values and attempt to retain their employment. The best way of determining what to do in choosing the retirement or turnover assumption, is to review the plan's experience and to discuss the issues with the plan sponsor.

The economic assumptions that have been mentioned are what might be referred to as the "standard assumptions" employed for valuing our pension plans. They are not employed for all our plans, however. There are many factors that the actuary must consider when determining what set of assumptions to employ.

For example, additional conservatism may be indicated for multi-employer plans. These plans combine elements of both defined contribution and defined benefit plans. If the assumptions prove overly optimistic, funding problems may develop, and the process of increasing contributions will prove very difficult.

Investment strategy and risk generally does not have any major influence on the investment return assumption we select. It is assumed that the higher yield potential of certain types of assets is offset by their greater risk. However, the existence of substantial amounts of assets with predictably high or low rates of investment return would be considered.

Plan size can also dictate the choice of assumptions. The use of sophisticated valuation procedures and selection of complex assumptions may not be warranted for very small plans.

Communication with the plan sponsor is very important. The plan sponsor can be of valuable assistance in selecting some of the assumptions. In addition, the plan sponsor should be aware of the rationale for selecting assumptions and their impact on funding levels.

For example, very few plan sponsors will question the selection of a particular mortality table or set of employee termination assumptions. However, everyone seems to be an expert on inflation and investment returns, and they all have opinions that differ. I believe that most plan sponsors envision themselves as economists and you are aware of how economists' opinions differ. Harry Truman once remarked that he wanted to meet a one-armed economist because economists were always saying: "On the one hand, this, and on the other hand, that."

One of the challenges our profession must face is to explain the rationale for selecting an inflation assumption that is relatively low when compared with current rates of inflation. In addition, I'm sure many of you have been asked why the investment return assumption is less than the investment yield being earned on current assets.

These questions are very legitimate. As a matter of fact, we are beginning to explore the possibility of developing systems that would permit the use of economic assumptions that vary by duration. I would be interested in learning of the experience of others in this area.

There is one method we have sometimes employed that recognizes the relatively high yields on current investments. For example, investments in the general accounts of insurance companies are reasonably secure and their investment yields are quite predictable. When the internal cash flow from those investments is compared with the cash flow requirements of benefits being paid to retirees, it is discovered that they closely match. They are close to being in what is referred to as a "state of immunization." Therefore, there is little risk associated with either reinvestment or forced liquidation.

Under these circumstances, if the assets are sufficient, the retired life liabilities can be valued at an interest rate consistent with the current rate of interest being earned by the assets. Modest margins can be deducted from the current rate to cover any residual risks. The rate of interest employed for this calculation can substantially exceed the rate of investment return being assumed for the remainder of the actuarial valuation.

As mentioned earlier, there are several reasons for selecting an inflation assumption that is significantly lower than the "Banana Republic" standard of inflation prevailing in the U.S. today. For example, the time horizon of the valuation is very long term. Historical studies tell us that while today's inflation rates have been experienced in the past, they may not be likely to prevail in the future. In addition, current actuarial practice indicates the selection of a relatively modest rate of inflation. Finally, the uncertainty of the future and the need for conservatism dictates a moderate inflation assumption. I would like to spend a few moments emphasizing the need for conservatism.

The current high rates of inflation have placed pressures on pension plan sponsors to improve benefits to retirees and to update career average or fixed benefit plans. Many plan sponsors have responded to those pressures by adopting ad hoc benefit increases or by switching to final average earnings plans. A few plan sponsors have adopted automatic benefit increases for retirees, generally with some type of limit. Public employee plans and Social Security are typically the only plans that are fully indexed.

If the current high rates of inflation continue, there is going to be increasing pressure to improve benefits. Private pension plans will have to respond effectively to those pressures in order to preserve their relative role in providing retirement income security. If they do not effectively respond to those pressures, I am concerned that the role of the government will further expand.

Many of you have probably read the recent Business Week article that contends that private pension plans are unable to cope with inflation. While I feel that inflation must be brought under control, I do not agree with the premise that private pension plans are unable to cope with inflation. For example, in recent testimony before the President's commission on pension policy, Harrison Givens, an actuary employed by the Equitable, testified: "The cost to private pension plans of indexed benefits in an inflationary economy should be in line with the costs of constant benefits in an inflation-free economy -- the problem for private plans is not in runaway benefits but in disastrous investment results." He also stated that: "Private plans, being funded, are better able to increase benefits than is Social Security, which is unfunded."

You are probably wondering how this affects the need for conservatism justi-

fying the selection of modest inflation assumptions. If the private pension plan benefits were fully indexed, there would not be as much need for conservatism. The influence on funding levels of use of a high assumed investment yield that includes a substantial inflation component would be largely offset by the necessity to fund benefits that are projected to increase rapidly.

However, private plan benefits are typically not fully indexed. Further, the IRS does not permit funding for anticipated inflation-related benefit increases unless such increases are explicitly guaranteed by the terms of the plan. Even where the increases are explicitly guaranteed, funding is not permitted if the benefits exceed the current section 415 limits.

Under these circumstances, if the actuary assumes a high rate of future inflation and thereby increases the investment return assumption, current funding levels will be reduced. An increase in the inflation assumption will have the greatest reduction in funding levels for fixed dollar benefit plans and for career average plans employing the unit credit funding method. While the impact on funding levels for final average earnings plans will not be as substantial there would still be a reduction in funding levels.

However, if the assumed high rates of inflation actually prevail, it is very likely that there will be substantial pressure for benefit increases. This will require an increase in future funding levels that may prove to be too substantial for the plan sponsor to absorb. Alternatively, if the benefits are increased to reflect inflation, problems of intergenerational equity are developed as funding levels expressed as a percentage of salary would likely increase.

Problems of intergenerational equity are very much in evidence in our underfunded public employee retirement systems and in the pay-as-you-go Social Security program. These problems are only now beginning to be recognized. The demographics of our country are going to exacerbate the problems for future generations. For example, if current Social Security benefits are continued, they will cost an estimated 24% of payroll after the turn of the century.

Actuaries have an important responsibility to encourage proper levels of advance funding to help avoid these intergenerational problems. An argument could be made that it would be appropriate to assume an investment yield equal only to the "real return" assumption, such as 3%. Other economic assumptions would similarly be adjusted to eliminate the inflation component. Much of the actual investment yield in excess of this "real return" may be considered as representing inflation. The excess yield could then be used to finance benefit improvements. This approach is implicit in Harrison Given's statement before the President's commission. Again, he said: "The cost to private pension plans of indexed benefits in an inflationary economy should be in line with the costs of constant benefits in an inflation free economy."

While I am not advocating such an approach to valuing pension plans, our profession should exercise caution when selecting an inflation assumption.

We should not be misled by current rates of inflation as history tells us they are not likely to prevail in the long term. In addition, we must recognize the consequences of assuming high rates of inflation for valuing pension plans that are not fully indexed for inflation. Those consequences dictate the choice of an inflation assumption that is modest by comparison with the

current economic environment.

MR. JEFF FURNISH: In this section of the discussion, the choice of economic assumptions will be examined within the legal and economic environment in which we function. The Society must examine whether traditional actuarial methods present a realistic picture of plan economics to our clients and the public; I will suggest a number of major areas in which they currently do not. First, the overall realism of the standard valuation techniques will be discussed, followed by a review of the selection of individual assumptions.

I would like to consider the following five areas in which the standard valuation techniques are unrealistic:

1. Evaluation through a limited number of decrements.
2. Use of closed group methods.
3. Asset accumulation to meet liabilities.
4. Nonrecognition of future benefit increases.
5. Restriction of funding to ERISA benefit maximums.

Our methods assume that actuarial liabilities can be effectively evaluated through a limited number of decrements. Unfortunately, not enough attention is paid to the most important decrements. For example, the uncertainties of the future economic vitality of the plan sponsor and the future of the plan's design are decrements which we normally ignore entirely, although they generally have more impact on future contribution levels than the decrements we do examine. Within the commonly used decrements, we lack detailed information concerning turnover assumptions, and yet this decrement usually has a much larger impact on the stability of contribution levels than such factors as mortality and disability rates. Recognizing that simplicity can be maintained only through use of a limited number of decrements, the appropriate professional response would seem to be more analysis of the sensitivity of contribution levels to changes in each of the decrements, and a corresponding commitment by the Society to develop data and technique in proportion to the sensitivity of the factors.

Concerning closed group methods, the restriction of funding methods to those recognizing only the current employee population is inherently unrealistic, and is essentially at odds with the assumption that the plan will be ongoing. Future expansion or contraction of the workforce is an economic assumption which operates separately from turnover, which is a personnel assumption.

While projection valuation techniques using new entrant assumptions have been developed, they are rarely used, and then only for informational purposes in conjunction with closed group methods. This reflects the IRS prohibition of projection valuation methods, which apparently is based on the potential for manipulation of contribution levels through the new entrant assumption. Given that projection methods attempt to evaluate realistically this major decrement, and that actuaries are constrained by ERISA's best estimate requirements, the prohibition appears to be an obstacle to reaching a realistic treatment of potential liabilities.

Perhaps we have not objected to the prohibition due to our comfortable familiarity with closed group methods, or because we do not wish to face the challenge of developing new entrant assumptions. I would suggest that, while the closed group approach may be conservative, relative to a projection method assuming new entrants in terms of current contribution levels, this conserva-

tism does not extend to projected liabilities. Furthermore, the closed group method can be overly liberal when we examine the converse of the new entrant assumption - what I call the declining industry assumption. In the environment of a contracting workforce, traditional closed group methods generate assets to cover past service liabilities slowly, placing tremendous upward pressure on cents per hour costs as the workforce declines.

Multi-employer plans frequently function in industries where an employer's business may be highly unstable. The prohibition against use of a declining industry assumption seems intimately related to the difficulties involved in developing appropriate termination insurance for multi-employer plans. Until funding techniques are refined to recognize the economic prospects of the plan's sponsors, it will be impossible to effectively address the funding problems of these programs.

Another assumption of our actuarial methods and, in fact, U.S. tax policy is that it is appropriate to accumulate assets in order to fund accrued liabilities. In reviewing the investment experience of pension funds over the last ten years, one may wonder whether the tax incentive provided for this massive asset accumulation in fact represents appropriate fiscal policy. One alternative, the book reserve approach, has been successfully applied abroad in response to high inflation rates (Argentina) and capital formation needs (Germany). While asset accumulation is the only choice currently available to us, we must effectively explore the alternatives to ensure harmony with economic reality.

A fourth area in which our present funding techniques seem to be inherently unrealistic is the IRS prohibition against recognition of expected future benefit increases. In this situation, it may be argued that it is appropriate not to allow prefunding of benefit increases which may, in fact, never be adopted. On the other hand, those of you who work with negotiated plans are aware of the distortion caused by assuming that current flat dollar benefit levels will remain in effect over the entire funding period. Similarly, it seems inappropriate that lower current contribution levels are generated for the company that adopts a career average formula with a regular updating policy than for the company that adopts a final pay program.

Another unrealistic assumption which the Internal Revenue Service is attempting to enforce upon the profession is a restriction of the funding of projected benefits to the current maximum dollar amount allowed by ERISA. The IRS' attempt to turn a benefit limitation into a funding limitation has been heavily criticized elsewhere. The only saving grace of this funding limitation is its limited operability in most defined benefit plans. However, it must be noted that the operability of this limitation increases with increasing salary scales. If, as has been suggested, it is appropriate for the profession to move to higher average salary scales than currently in use, we must also be prepared to face increasing funding distortion caused by this limitation.

Turning now to the selection of individual assumptions, while having serious reservations about the so-called explicit assumption approach, I am now moving toward the requirement that individual assumptions be reasonable standing alone. In the past, I have justified use of implicit assumptions to myself on four grounds: First, that the inherent conservatism represented an appropriate margin for error; second, that explicit assumptions were overly influenced by current market conditions and therefore lead to frequent change



and unstable contribution patterns; third that a "realistic" salary scale would encourage higher wage demands from unions; and fourth, that implicit assumptions were widely accepted in the profession and therefore subject to limited criticism. In reviewing these reasons, my "margin for error" seems somewhat inconsistent with the spirit of ERISA's "best estimate" requirements. The ability to maintain an implicit interest rate assumption suggests that an explicit interest rate can also be maintained in the face of current market fluctuation. In many of my cases, union wage demands are not an issue in setting assumptions, and even where they are, my projections are likely to be given zero 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. In short, I find that my use of implicit assumptions has been more rationalization of past practice than recognition of current conditions.

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 your 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 interest 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 are not fully comparable.

In examining individual assumptions, note that all assumptions made in a valuation affect the contribution level. In that sense, all valuation assumptions are economic assumptions. The first individual assumptions I will discuss are the selection of a salary scale and interest rate.

The common practice of focusing on the spread between these two assumptions essentially presumes that these factors are sufficiently interrelated that salary scale losses (or gains) will be offset by investment gains (or losses). In this regard, the following observations should be made:

1. At the least, the plan must be well funded for these gains and losses to be comparable over the near future.
2. In recent years, there has not been an offsetting effect between the experience under these two assumptions.
3. As a general working rule, I have found that a 1% increase in the interest rate requires a corresponding increase of 2%, not 1%, in the salary scale in order to generate similar current contribution levels.
4. The length of the funding period may affect the interrelationship of these two assumptions.

I am particularly troubled by the fourth point, for two reasons. First, it suggests that for clients who are funding their plans at the maximum deductible level - 10 years - the relationship between interest rate and salary scale may fall outside the bounds of what is traditionally considered a reasonable spread. Even more troubling, since the client normally decides the funding period internally, a switch in client practices concerning the

the funding period may require a corresponding change in the relationship of these two assumptions. Would this suggest that the maximum contribution could be based on a different set of economic assumptions than the minimum contribution?

In the area of asset valuation methods, I typically average market values over a five year period in order to reduce the potential adverse impact of market value volatility on the stability of the contribution level. It may be noted that the movement to a more stable asset measurement means a corresponding move away from current market value and therefore an introduction of some degree of short term unreality.

We commonly assume a single retirement age - usually age 65, if the plan has nonsubsidized early retirement. Under such an assumption, if the plan freezes benefits at normal retirement age, late retirement will produce a gain. Early retirement also frequently produces a gain because future accruals (and potential plan improvements) are forfeited at a point where no employee turnover is assumed. It seems inappropriate that any type of retirement other than normal retirement produces a gain under the retirement age assumption.

We often develop disability assumptions to produce an add-on cost to the retirement benefit liability. This fails to recognize that the disability decrement also applies to retirement benefit liabilities. If the disability decrement is applied in conjunction with the turnover schedule to reduce the age-related retirement costs, it may be found that the decrease in retirement costs for disability is equal to or greater than the cost being assigned to the disability benefit under the plan. A tempting rationale for present practice is that the disability decrement is included in the turnover decrement. Unfortunately, disability rates often exceed turnover assumptions at the later ages. Again, the profession must resist the temptation to rationalize away the discrepancy if we are to effectively assign costs relating to disability.

We typically set turnover assumptions by age, and salary assumptions as an annual percentage increase. The next level of sophistication would be to set turnover assumptions by age and service and to set salary scale assumptions by age. While on most cases there is insufficient experience to justify the more detailed level of assumptions, the more detailed structure has the subtle effect of increasing contribution stability in periods of economic uncertainty. Specifically, the more detailed assumptions seem to more accurately address the liabilities associated with older, longer service employees. Under most plans, this is where the bulk of liabilities are concentrated. The more detailed assumptions also tend to assign smaller amounts of liability to the benefits of those employees who are most likely to be hired in periods of expansion and most likely to be terminated in periods of economic contraction. Therefore, the more detailed assumptions tend to increase stability in contribution levels.

Before closing, several observations relating to our experience with floor pension plans may be in order. First, in relation to my earlier comments on the wisdom of asset accumulation under traditional funding methods, floor plans do in fact represent an alternative to traditional methods. Because the underlying defined contribution plan can have a discretionary contribution formula, the floor plan approach gives a client much more control over short term cash flow into his retirement program than would a defined benefit plan standing alone.

Second, the leveraging of the defined benefit supplement in the floor plan makes the actuarial assumptions considerably more sensitive to experience than under a defined benefit plan standing alone. This sensitivity increases the urgency of the choice between implicit and explicit assumptions, as well as the problem of being overly influenced by current market conditions in setting assumptions.

Third, valuation of floor plans has increased my awareness of how liabilities weight the turnover assumption. To illustrate, consider a floor plan with an integrated defined benefit supplement and a nonintegrated profit sharing base plan. It is quite possible that virtually all of the lower paid employees will have no projected benefit under the defined benefit supplement, and therefore generate no liability under the defined benefit plan. Clearly then, turnover among these employees is irrelevant and should be ignored in setting the turnover assumption. By extension, it is clear that an appropriate turnover assumption under a defined benefit plan must be a weighted average of group experience, and that the weights should relate to the projected benefit liability associated with each employee. From here, a variety of approaches suggest themselves, one strong candidate being a turnover assumption varying by salary level. Again, sensitivity analysis is needed to assist in applying theory to individual cases.

In summary, we must all take a broader look at the environment in which we typically set assumptions, and through this re-evaluation of procedures provide increased credibility to our professional practices.

MR. HENRY BRIGHT: My presentation this morning is going to be in two parts which are essentially separate although related. In the first part I am going to briefly comment on pension plan economic assumptions from the Canadian viewpoint. In the second part I am going to make a number of comments on the nature and effect of the inflation assumption incorporated in pension plan valuations and funding policy, both in general terms, which could be applicable to both U.S. and Canada, and also with specific reference to some of the factors in the U.S. that impact on and often restrict appropriate handling of the inflation assumption.

The Canadian economy is closely tied to the U.S. in many ways. Standards of living and levels of earnings are generally comparable. Because of the close link between the economies, factors such as inflation, unemployment, recession, depression and so on tend to be fairly closely correlated between the two countries although there is often a lag or difference in degree.

In the area of pensions, while the fundamentals are roughly comparable there are a great number of differences in detail. Canada has a social security program somewhat comparable to the U.S., but in Canada it consists of Old Age Security which is a universal demogrant financed by taxes, not by contributions, providing a first layer of income, currently close to \$200.00 a month, which is fully indexed; and the Canada Pension Plan which is a contributory program more comparable to U.S. social security, which currently calls for contributions of 1.8% each from employees and employers up to \$13,100 a year, and provides a benefit of 25% of indexed average earnings payable at 65. Benefits under the Canada Pension Plan are also fully indexed. The base or ceiling of \$13,100 is scheduled to increase at 12.5% a year until it catches up to the average industrial wage, which is anticipated to happen about 1984, and thereafter it will increase in line with the average industrial wage.

Private pension plans in Canada are generally similar to those in the U.S. but employee contributions are much more common and career average plans are relatively more common. One reason for the greater prevalence of employee contributions is the fact that these are tax deductible.

While the American Academy of Actuaries recommendations on the treatment of inflation in pension plans are not applicable to actuaries in Canada, the Canadian Institute of Actuaries has developed guidelines which are similar in some respects, including the recognition of inflation in the assumptions. Also, the Provincial Pension Commissions, especially in Ontario and Quebec, have, since 1965, been exercising a role that includes supervision of actuarial assumptions, as has also the federal Department of National Revenue. A number of pronouncements have been made in this area. For example, the Department of National Revenue some years ago changed their former practice, which did not allow the inclusion of inflation assumptions in valuing indexed pensions, to one of allowing for such assumptions in developing plan costs, but they also adopted the rule that the rate of inflation assumed must be at least 2% less than the assumed rate of investment return. They also require that the assumed rate of investment return be not less than the assumed rate of salary increase. Under the Ontario Pension Benefits Act, funding for automatic cost of living adjustments can be on a pay as you go basis.

The Ontario Pension Commission, in practice, will question and ask for justification for any actuarial valuation using an interest assumption over 7%.

At the present time typical Canadian practice is to have a gap of 0% to 2% between the salary scale and the investment return, with a gap of 1% to 2% between the inflation assumption and the salary scale. For example a typical combination of economic assumptions might be 6% investment return, 5% salary scale and 4% inflation. It is not uncommon in Canada for the salary scale assumption to be equal to the investment return.

The recent Financial Executives Institute survey found an average interest assumption of 5.8% and an average salary increase assumption of 4.7%. This is a little out of date - the assumptions would be higher today.

The assumptions used to project Canadian Social Security (Old Age Security and Canada Pension Plan) would be the same C.P.I. and wage increase assumptions used to value the plan benefits, but a 12 1/2% increase factor in the Canada Pension Plan "Wage Base" would be used for the next 3 or 4 years to allow for the "catch-up" factor. The calculations are very straightforward, unlike the U.S. Social Security projections.

In the past year or so several studies of the general area of retirement income security have been carried out in Canada. Among these are a study by a committee appointed by the Quebec Government entitled "Cofirentes +" which was carried out by a committee headed by an actuary, and "Retirement without Tears" a study carried out for the Economic Council of Canada. While these studies are primarily directed to areas of retirement needs and sources of retirement income, the subjects of inflation and the ravages wrought by inflation, and possible solutions to the problems of inflation, are a major theme in all of these reports. The general tenor is to the effect that one way or another the problem of erosion of pensions by inflation has to be solved. For example the "Retirement Without Tears" report states "the inability of private pension plans to index pensions is a serious handicap in an inflationary period. This explains, in part, why the committee has

favored the expansion of the public pension system." The Cofirentes report proposes an increase of about 50% in the benefits provided by the Canada pension plan and also makes various suggestions as to how private pension benefits might be indexed. The "One in Three" report cites the definition of inflation as "a method by which the able bodied rob the aged", and recommends the sale of cost of living indexed annuities to pension plans by the government. This report also discussed the concept of inflation insurance for pension plans and makes the comment that "if nothing can be done to effect major improvements in inflation protection provided by private pension plans, there will be little alternative but to expand the Canada Pension Plan."

Turning now to the subject of inflation assumptions in the U.S., I have a few comments. In the U.S. the same concerns about inflation are present as in Canada and the same fear of automatic indexing of private pensions is prevalent. One difference in the U.S. versus Canada with regard to the inflation element is the new requirement of FASB No. 35 that the investment return assumption for valuing accrued benefits be the actuary's best estimate for that element alone. Another difference is that there is no specific prescription in the U.S. corresponding to the Canadian requirement for a spread of at least 2% between inflation assumptions and interest assumption.

It is my opinion and contention that the danger of automatic indexing, and the effect of attempting to fund for such a plan provision, has been greatly misunderstood and exaggerated by actuaries and non-actuaries alike. This is not to suggest that full indexing is desirable, but rather to suggest that some degree of automatic indexing is by no means the monster it is made out to be.

For example the statement is often made that there is no way to determine in advance the cost of full indexing of pension benefits. This is true, of course, in the sense that there is no way to determine in advance the cost of any pension benefit, whether it is indexed or not. The message conveyed by this statement with reference to indexing is, however, that there is no limit to the potential cost of automatic indexing. Again this statement is obviously literally true in terms of the cost expressed in dollars. However, if one were to make this statement in terms of constant value dollars, or, for the totality of all pension plans, in terms of a percentage of G.N.P., it is no longer valid. For example, it seems to me it would be quite reasonable to assume that regardless of the rate of inflation, a well managed pension fund should be able to achieve a rate of return of at least 0% in real terms, that is, a rate of return on average equal to the rate of inflation. The Ibbotson - Sinquefield studies have shown that over the period 1926 to 1978, investments in Treasury Bills would have achieved this objective over most sub-periods.

I would expect that in fact, and over a fairly long term, it is reasonable to anticipate a real return of 2% or 3%, but I am postulating only 0% in order to emphasize the point.

If one could make such an assumption, one could then make a conservative estimate of the cost of funding a fully indexed plan by valuing the post retirement benefits at 0% investment return. While this would obviously increase costs substantially, it would not be an unlimited cost.

The other side of this coin is that where liabilities for pensioners are currently being valued using inflationary assumptions such as 6% or 7% investment return, the liabilities, and consequently the plan costs, are computed

to be less than they would be if there were no anticipation of future inflation. In fact it is fairly easy to demonstrate that, if inflation were to disappear, and assuming that the relationship between rate of inflation, rate of investment return and rate of salary increase were to remain approximately constant, the costs for many or most private sector plans would increase over those presently anticipated. This is particularly apparent under a flat dollar benefit plan, where the elimination of inflation would have no effect on the anticipated benefit, but would obviously cause a reduction in the investment return assumption used to compute the present value of the liabilities, with a consequent increase in those liabilities. The same would be true to a lesser extent under a career average plan, because under that kind of plan the effect of a reduction in the interest assumption, during the pre-retirement period, is much greater than the effect of a reduction in the salary scale, assuming one is used. In addition, of course, the reduction in the assumed investment return increases the value of retiree pensions, whereas the elimination of the inflation assumption has no effect on the anticipated benefit payout.

Under a final pay non-indexed plan, the changes in the interest assumption and the salary scale balance each other very closely in the pre-retirement period, but again in the post-retirement period the effect of a reduction in the investment return assumption is not balanced by any similar effect on the anticipated benefit payment.

Only where a plan is fully indexed is there more or less equal balance of effects from the elimination of inflation. Even for a fully indexed plan this balance exists only under the hypothetical situation of an equal change in each of the assumptions, which undoubtedly does not correspond to reality. Also in terms of plan costs, the equality applies only if the unfunded liabilities are amortized by a level percent of future assumed payroll, based on the same inflation assumption as used in computing the liabilities.

In developing funding requirements for plans that do have full or nearly full cost of living provisions, and in using "realistic" assumptions for such plans, I have run into the problem that APB Opinion No. 8 calls for a minimum expense requirement equal to interest on the unfunded liability. Such a requirement is quite inappropriate for a plan of this nature which is being valued using inflationary assumptions, because the result would be a plan cost that decreases as a percent of payroll, if the assumptions are met. If the assumptions are not met, that is if the anticipated inflation does not occur, then some of the anticipated liabilities will not come into being and it should not be necessary to pay interest on those "liabilities". I hope that the FASB study now under way, on the general subject of accounting for pension costs, will recognize this point and allow for funding as a percent of payroll.

Of course ERISA also follows the APB Opinion No. 8 requirement of level dollar funding, and, in the case of ERISA, over 40 years or 30 years, or 15 years for experience losses. Consequently, for a plan that is fully indexed and using inflationary assumptions, ERISA would require funding as a decreasing percent of payroll.

It is worth noting that Congress recently passed a law relating to reporting for federal government pension plans. The law is PL 95-595, and it requires reporting similar to that required under ERISA, including actuarially determined costs and liabilities. In order to have consistency between plans, a 5% long term inflation assumption has been prescribed for reporting purposes,

and the actuaries for the various federal plans are presumably free to select the appropriate investment and salary scale assumptions that would be consistent with a long term 5% inflation assumption. The approach that is being taken, by the major plans at least, is to assume that average earnings will increase by about 5 1/2%, that is 1/2% more than the rate of inflation, and to superimpose on the rate of general salary increase the pattern of merit and promotional increases based on experience, probably approximating an additional 2%. The assumed rate of investment return will vary somewhat, since, for example, the Civil Service plan assets are by law required to be primarily invested in certain types of fixed income government securities which cannot be expected to return more than about 1% real return. On the other hand some of the other systems are free to invest in all types of investments including equities, real estate, short term investments, or any other types, and it is expected that some of these will be using investment return assumptions ranging from 7% to 8 1/2%.

In conclusion, I think we, as actuaries, have a problem. On the one hand, we are supposed to incorporate in our assumptions an allowance for our best estimate of future inflation. But since hardly any plans are indexed after retirement, and many are not indexed before retirement, the resulting costs may be said to be dependent on, and to anticipate, pensions that decline in purchasing power. If the expected inflation does not materialize, or if it does materialize and benefits are increased periodically to keep up, costs will increase as a percent of payroll.

The best answer I have to this problem is to be quite conservative as to the inflation assumption and advocate rapid funding (10 to 15 year amortization of liabilities).

A more controversial suggestion would be to redesign plans so that any excess investment returns over the expected "real" return on funds for retirees would be used to increase benefits, subject to some controls.

For instance, only the cumulative excess return would be used this way, and the increases would not exceed, say two-thirds of CPI. Under such an approach the postretirement interest assumption would always be the expected real rate of return.

#### DISCUSSION

MR. THOMAS D. LEVY: Jim Swensen mentioned something about using a short term interest rate on existing assets if there is an immunized kind of portfolio. Proposed asset valuation regulations say that it is necessary to obtain advanced approval for a change in asset method. Does he consider this to be a change in asset method or change in assumptions, and does he plan to ask IRS for approval each time he is going to do it?

MR. SWENSON: This is the type of a change that I would suggest does require IRS approval and I would seek IRS approval when I anticipate using such an approach.

MS. MITCHELL: We are trying something similar in our office and it is our position that it is an assumption change which does not require approval. We have had considerable discussion with the IRS on this point. The IRS seems concerned that because the interest adjustment is related to the amount of the assets, that prior approval may be required.

MR. JAMES C. HICKMAN: Jim, your exposition on real rates of return is so powerful that I am quite persuaded. Why did you end it by saying that you do not advocate it?

MR. SWENSON: It requires a substantial change not only in the IRS view of the world but also in the plans which a plan sponsor is willing to adopt. Essentially Canada, as I understand, is doing something that is similar to this. They refer to it as performance indexing. I believe that in the U.S. the Rockefeller Foundation may be doing something very similar to that. I again do not advocate it as a valuation technique although from a standpoint of a plan design approach it makes sense. When plan sponsors view inflation, one of the things that they are concerned about is the nature of the risk that they would have to bear to fully index pension benefits. The plan sponsors may find this an acceptable way of approaching inflation, since the burden of the inflation risk is borne by the participants. As many of you are aware the Prudential was a company that was a strong advocate of the variable annuity. Unfortunately, our timing on the variable annuity market could not have been worse. We selected to enter the market in the mid to late 60's. The variable annuity is designed for the excess investment yield to be used to benefit the plan participant. Unfortunately this did not occur since there was no real investment return over what we assumed as an assumed interest rate when discounting the variable annuities. However, in saner times or with a different mix of investment, it could very well be that this will be an approach which plan sponsors should be looking at.

MR. NORMAN W. CLAUSEN: Could you comment on whether or not you think actuaries will be using select and ultimate type economic assumptions, assuming a high rate of inflation for the next 10 years and a lower ultimate rate?

MR. SWENSON: As I mentioned, we are merely thinking about using that type of an approach. We have begun to look at how that could be accomplished and as I indicated, I would be interested in learning what others might be doing in this area.

MR. MILTON LANCE: Mr. Swenson, why do you assume real wage increases of only 1%? Are you looking at the last decade and saying future real wage increases will continue to be low?

MR. SWENSON: I hope the productivity growth does exceed 1%.

MR. LANCE: Do you mean productivity increases or real wage increases?

MR. SWENSON: I view productivity and real wage increases as equivalent: wage increases in excess of inflation. One reason we can utilize a salary scale assumption which includes only a 1% real wage increase is related to our use of what might be perceived as an ultra-conservative approach toward salary scales which includes a third factor. The factor takes into account the aging of an employee. Consider an employee who enters the work force at age 35. One of our typical salary scales projects salaries which increase at an annual rate of slightly in excess of 6 1/2% for this employee's working lifetime. That 6 1/2% exceeds the 6% interest rate assumption that we employ.

MR. JOSEPH P. MCALLISTER: Our company has been using select and ultimate turnover rates for several years. I thought that a select and ultimate interest rate assumption was widely used. I want to compliment Jeff Furnish for bringing some ideas that I think we ought to all look at and in particular, the



weighting of the turnover assumption as select by salary. The floor plan points up the desirability of that.

MR. FURNISH: I might mention one other thing concerning the economic assumptions related to floor plans. Basically, in a floor plan situation, one is faced with the problem of converting profit sharing amounts or some other defined contribution plan to an annuity amount which will be used as an offset against the total defined benefit promise. That conversion puts tremendous pressure upon the actuary to have factors that are relatively close to current market conditions. That in turn puts pressure on the actuary to have economic assumptions under the defined benefit plan that are comparable to the assumptions being used to make the conversion under the profit sharing plan. That was what I meant when I said that there was more urgency in the floor plan environment toward recognizing current economic practices. I want to mention one other problem that I have encountered with my largest client, which has a floor plan. The plan document prescribes early retirement factors of 5/9%, 5/18%. An examination of these factors indicates that the interest assumption that underlies them is 3 1/2 or 4%. These factors are creating a problem for me in relation to the annuity conversion factors that are applied to the profit sharing plan. We will probably move to larger early retirement reductions: in the neighborhood of 7/10%, 7/20%. For those of you who have not looked at those factors for some time, you might want to do that since you are providing a subsidy for early retirement, which you might not be aware of.

MR. BRIGHT: Jeff, assuming that the IRS would permit actuaries to incorporate an increase assumption in valuing collectively bargained flat dollar type plans, do you think it would be feasible to do so in light of collective bargaining considerations?

MR. FURNISH: That is a difficult question to answer. There is a significant problem in trying to recognize the future benefit increases without changing the plan sponsors' attitude toward the manner in which the contribution levels are generated in plans where costs are expressed on a cents per hour basis. Congressional upheaval concerning the termination insurance problems of multi-employer plans is related to those problems inherit in the current environment of not looking at future benefit increases and future contribution increases.

We have to reexamine those issues if we are to effectively address the serious problems that multi-employer plans currently face. I might mention one other thing about the new entrant assumption. When I was in the East, I had a very large multi-employer case. They were laborers in a declining employment market. However, the city they were in was considering building a subway which would have tripled employment in that industry. In that kind of environment, the difficulty of deciding whether or not that is a declining industry or one with appropriate new entrant expansion is quite serious, and I do not know how I would have chosen that assumption if required to do so. My point is that using a closed group method without making an assumption either way is really an arbitrary fixing of that issue. It is one that we typically do not examine, but it was probably the major factor in the future viability of that particular plan.

MR. A. DAVID PELLETIER: One comment on Canada, that ties into one of the points that Jeff Furnish raised about some of the short-commings of the current actuarial bases that are now in use. Jeff mentioned that one of the short-commings is that the current ERISA maximum benefit cannot be projected into

the future. That is a shortcoming which actually is much more serious in Canada. In Canada the current maximum pension payable is \$60,000 and that does not go up year by year. It goes up in jumps as Revenue Canada decides to move it up. With assumptions like 5 1/2% + merit promotion on salary, 6 1/2% interest, it is possible that employees currently earning \$15,000 will exceed the maximum pension by the time they retire. There are two solutions to that. The first one of course, is to use low rates of inflation, salary growth, and interest, but that tends to produce results and assumptions that the client does not see as being very realistic. A second approach that I have not often seen is to produce two sets of numbers. The same set of assumptions is used for both sets, but the second set ignores the maximum pension. Then use is made of the extra flexibility on the upside, of the contributions that can be made into the plan. In Canada the employer can contribute and deduct up to the full unfunded actuarial liability in any year. By producing two sets of numbers the client is able to contribute more based on the real numbers provided him and still get an entire deductibility for the contribution.

MR. FURNISH: I think that is a very good comment. One problem with the second approach is that it is basically a disservice to have one set of numbers that are public with one set of assumptions to fit the political environment, and another set of internal numbers based on a second set of assumptions which fit the economic environment that the client uses to make decisions. If we move to that type of practice in the United States, and it is becoming more widespread, we will have problems with the accountants.

MR. PELLETIER: I should point out that we are still using the same economic assumptions. The only difference is that we are taking out the effect of the maximum benefit. We are not changing our actuarial report at all, and the client still has numbers that relate to the same benefits. The client is merely contributing more than the minimum required by law.

MR. FURNISH: I would suggest that problems arise if implicit assumptions are used. I recall in my conversations with clients, when somebody says: "The salary scale of 4% or 5% is not what is happening currently", it is very common to say: "If you assume a salary scale of 9%, if you think that is more reasonable, here is the anticipated result on your contribution level." If there is some question about the interest rate I might say: "If you change that..." The point is that with implicit assumptions, one of the things that that I am coming to appreciate more and more, is that there are so many fudge factors involved, that I have some doubts about the overall credibility of all of those factors being set at a low level. That is really what my concern is with altering assumptions in order to get around the political environment in which we function.

MR. RAYMOND E. SHARP: Several participants in this morning's session have expressed concern over the proposed requirement of the IRS that, during an actuarial valuation, the projected benefits of each plan member must not exceed the current ERISA maximum benefit limitation. It is my understanding that the IRS is reconsidering its position on this issue. I also understand that Congressional action of some kind may take place if the IRS is not prepared to modify the original proposal.

Turning now to the interest assumption used for regular valuations of pension plans, I would be interested to know if Henry feels that the considerations underlying our choice of an appropriate interest rate for the accrued liabil-

ity calculation under FASB 35 will exert some influence on our choice of an interest assumption for regular valuations.

MR. BRIGHT: Only indirectly. I do not think that the interest assumption used for computing a present value of accrued benefits and present value of vested benefits should be the same as the assumption used for funding. There is theoretical justification for a different assumption there. For example, there is no reason that the use of 8% for valuing vested benefits should create any pressure to go to that level for funding requirements. It will create an increased consciousness of the effects of inflation on higher interest rates, and so indirectly, it will have some effect.

MR. CLAUSEN: I have never seen anything published but it is my understanding that the Ontario Pension Commission has some minimum guidelines concerning economic assumptions. Henry, are you familiar with them?

MR. BRIGHT: I do not know of any specific guidelines. I do know that as a working rule they question any interest assumption over 7%. In general though, they are going to question any set of actuarial assumptions that falls outside of the norm or the fairly wide band of normal practice. Would any Canadian experts in the audience like to comment on that point?

MR. D. JAMES CHRISTIE: The guidelines, that the Pension Commission of Ontario was following a few years ago, were that actuaries could use an interest rate up to 6%. If 6% were used, the salary scale for a final pay plan had to be not more than 1% lower than the interest rate. If an interest rate of 5% was used, a 3% salary scale or up to a 2% differential could be used. As the interest rate goes up the salary scale must go up more rapidly. Currently they will accept an interest rate up to 7%, but the salary scale would have to be at least 6%.

MR. LEVY: Something that concerns me, that I am hearing here and that has been discussed before, is that the plan design influences our "best estimate" of what the future inflation rate is going to be. Admittedly, that is because of most of the reasons that Jeff mentioned about the IRS. Nonetheless as professionals, we have a problem saying that our best estimate varies by the design of the benefits when the economic climate is nominally the same and the investments are the same. Do others think that is a problem and if so, how should we deal with it?

MR. BRIGHT: It is a very serious problem. I do not have any answers, but the fact is that I might be willing to use 7% or even 8% assumed investment return in valuing a fully indexed pension plan, and I would have much greater qualms about doing that for a flat dollar benefit plan, and yet the investment expectation can be the same in both cases. However, in a final pay plan or a final pay indexed plan, you have the security that, if the inflation does not materialize and the high investment return is not realized, there will be counter-balancing gains on the benefit indexing and on the salary scale elements. In the flat dollar plan there is no such counterbalancing gain. On the basis of ordinary prudence and ordinary conservatism, I make a distinction and say I cannot use the same level of inflation assumption in valuing a flat dollar benefit plan that I can in a final pay index plan because I have no safeguard.

MR. SWENSON: I share the concern that you do, Tom and Henry, but as I indicated, I do not think that anyone in this room can accurately predict what will happen to inflation in the future. Looking at very long-term history

of inflation shows us that, although today's rates have been experienced, the prevailing trends of inflation are considerably lower than those which are currently prevailing. What we are really trying to do is predict from long term history and that choice dictates a relatively moderate assumption.

MR. PAUL RICHMOND: We have been using select and ultimate turnover rates for years. To your knowledge has there been any work done with respect to select and ultimate retirement rates?

MS. MITCHELL: In my company we do that for one large plan where the retirement assumption for a particular employee is calculated based on his projected retirement benefit. That is compared to his projected pay at various retirement ages and the ratio triggers a retirement age for that employee. We would not do it on a smaller case. This case is large enough to have stable experience and we have heavy early retirement subsidies. It can be done.

MR. BRIGHT: I have seen a plan, not one that I worked on, where select and ultimate retirement rates were used. After a certain length of service and certain age, employees could qualify for unreduced benefits. There were fairly high rates of retirement at a point when an individual hit that eligibility point, and then the rates of retirement tapered off for years after that. This gave a set of rates depending on when the individual reached eligibility.

MR. FURNISH: Several years ago some of the people I worked with were developing a method for computing the retirement age assumption based on the subsidy of the early retirement benefits. We first calculated retirement ages for all employees assuming each employee would retire as early as possible. We then considered the degree of subsidy under maximum utilization to determine what percentage of maximum utilization we expected to have, and then computed a single weighted assumed retirement age. This method has the advantage of looking at the more detailed factors involved in retirement while still maintaining the simple retirement assumption of a single age. We found even with that method a significant amount of divergence between the contribution levels that a single age would generate and the contribution levels generated by a multiple retirement age assumption. The difficulty with this method is that considerable experience must be developed in order to make statistically significant the way the retirements are weighted by benefit liabilities. Alternatively, weighting by benefit liability could be used in computing the weighted single age. It would of course be necessary to reexamine the retirement assumption each time the early retirement benefits are changed.