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Should you take a lifetime pension or a commuted value: An Actuarial Analysis of the Pension “Deal or No-Deal” Decision

You have terminated employment or retired, and the pension administrator has provided you with a termination / retirement package. You have the choice of receiving either:
- A lifetime pension of $X per month commencing at retirement; OR
- A lump sum payment of $Y (transferred to your LIRA with some paid as a taxable payment).

How do you determine which of these options is best for you?

This extremely important question faces most members of defined benefit pension plans when they terminate active membership in the plan or in many cases when they retire.

The choice of a lump-sum or a lifetime pension is a classic "deal or no-deal" type decision. Specifically, one option can wind up being much more valuable than the other option. Unfortunately, the more valuable option cannot be determined with certainty in advance of making the decision. In fact, in most cases, it will be many years after the decision is made before the more valuable choice is known.

Because of the uncertainty, it is important that the decision to take either the lifetime pension or the commuted value be made with as much information and analysis as possible.

Pension Strategies Inc., an Alberta based actuarial consulting firm, has developed an advanced model to assist in assessing the situation for an individual facing this decision. To describe the analysis, we present a sample case study.

Case Study

Bob is a male age 54 and has participated in a defined benefit pension plan for his entire career. He has been provided pension options upon his termination of employment as follows:

1. Commence a pension of $2,400 per month at his early retirement age of 55, or
2. Take a commuted value of $603,000, with $360,000 transferred to his Locked In RRSP, and $243,000 paid in a taxable lump sum payment.

Bob believes some mortality risk factors result in his mortality deviating from "standard" mortality expectations. He asked us to adjust the mortality assumption by adjusting the mortality rates to reduce his life expectancy by 1.6 years.

Bob, through discussions with his financial advisor, expects to have a pre-tax rate of return of 5.0%, although he expects the rate of return will be subject to deviations each year.

He wants to know whether taking the pension or the commuted value is best for him.

Pension Strategies Inc.
Helping Plan Members Assess Their Retirement Financial Plans

We will work closely with you and with your financial advisor in preparing this independent actuarial analysis. Please contact either Pat Johnston, Actuary, or Rob Easton, Senior Actuarial Analyst

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Due to contingencies such as mortality (the member might live to be well over 100, or might die right after retiring) and investment returns (although the member expects a 5% investment return on average, he might actually receive substantially less or substantially more than that), it cannot be determined with certainty that one option will work out to be better for Bob than the other option. As such, the ultimate decision must be weighed on the balance of probabilities, which generally involves risk. It will ultimately be up to Bob, working with his financial advisor on his overall financial/retirement plan, to assess how much risk he can accept.

Our actuarial role in this complex analysis is to paint the picture of what this risk really is so that Bob can make a better decision between the two options.

**Case Study Analysis**

**Step 1: Present Value Determination**

We first perform a present value analysis of the two options. This compares the expected value of the future lifetime pension payments to the commuted value, reflecting several factors such as:

- Investment return expectations
- Mortality expectations
- Loss of tax effectiveness on the portion of the commuted value paid in cash
- Loss of ability to income split the pension payments prior to age 65 if the CV option is taken
- Loss of the pension income deduction prior to age 65 if the CV option is taken.

For Bob in this example, the total CV is $603,000.

We determined the present value of the lifetime pension, after reflecting all the adjustments noted above, to be $502,000, a difference of $101,000 favouring the choice of the CV option.

As noted earlier, however, this step is only a present value comparison and should be viewed as an “average expectation”. It doesn’t identify the risks.

**Step 2: The Risk Picture**

Although the present value represents the average expectation, it doesn’t disclose how much risk there is of either outliving the assets if the CV is selected, or dying early and “forfeiting” what would have been the remaining CV amount payable to the estate. In our analysis, we assume that Bob either takes the lifetime pension, or invests the commuted value and withdraws from the investment the same payments as the pension would have provided.

For example, using standard mortality tables for pension commuted values, the life expectancy for a 54 year old male in 2012 is 30.0 years (i.e., until age 84). But this expectancy is only an average and doesn’t shed any light on how much earlier or later the member might die, or with what probabilities. If the CV assets only reproduce the pension for 25 year rather than 30 years, that is still better than the lifetime pension in the situations where the member dies before 25 years. Similarly if the CV assets reproduce the pension for 32 years instead of the expected 30 year average, that isn’t as good as the lifetime pension option in the situation where the member lives for longer than that.

The analysis performed by Pension Strategies Inc maps out this risk, by showing what the probability of survival is for the member, and the probability of outliving the CV assets and for how long.

**Graph 1—The risk of Bob outliving his assets**

For example, in the 10% of the simulations where the Bob dies earliest, he dies on average after 8.2 years and there were no simulation results where he had outlived his CV assets. On the other hand, in the 10% of the simulations where he lived longest, Bob dies on average after 42.9 years, and on average had outlived the CV assets by 6.3 years. The results for all the other 10% bands for age of death are also shown.
The prior graph indicates the risk probability of Bob outliving his funds, and for how long, but not the financial implication.

The following Graph 2 shows the information for the present value (in today's dollars) of the assets available at death, or if assets have run out, the present value of the deficiency in assets:

Graph 2: Present Value of Assets Remaining/Shortfall at Death
Depending on the age at death, there is a wide range of assets remaining (or shortfall) due to the variability in the investment return during the period. So the variability of the assets available for each to the periods is shown in quartiles. For example, in the 10% of simulations where the member died in the 50% to 60% range, the member lived on average for 31.1 years. For these same simulations, 25% of the time, the member had assets remaining with present value between $113,000 and $179,000; 25% of the time the assets were between $60,000 and $113,000, 25% of the time the assets were between $0 and $60,000, and 25% of the time assets were depleted prior to death and the present value of the shortfall was between $0 and $117,000.

Other Considerations
The decision to take a commuted value or a lifetime pension should not be considered in isolation. You should work with your financial advisor and make the decision as part of your overall financial/retirement plan.

For example, an individual’s overall financial situation and objectives, will affect:
- How much risk of outliving assets can be tolerated (are other assets available)
- The importance of the estate value of the CV (depending on the importance, life insurance should be considered so that the estate value is there regardless of how long the individual lives)
- The importance of providing survivor benefits to a spouse, and the spouse’s ability to invest the funds
- Importance of flexibility to adjust payment levels

Understanding Simulations
The actuarial analysis is developed using a Monte-Carlo technique. Under this method, a single simulation is created by randomly selecting a date of death in accordance with the probabilities of the mortality table. In addition, the investment return for each year until the date of death is randomly generated using the expected investment return and the probabilities for variance of the investment returns. Using these random results for the single simulation, we project the comparison of the cashflow that can be supported by the commuted value against the lifetime time pension and determine how much asset is left or how much shortfall was generated at the death of the member. This is one potential outcome (or "simulation"). We then run this simulation program 10,000 times (each one with its own randomly generated outcome in accordance with the expectations). We then summarize the overall results of the 10,000 simulations in order to paint the overall risk picture.

In this type of analysis, it is common to simulate investment returns only and compare the investment results strictly against the average life expectancy. The unique aspect of Pension Strategies’ model is that we also simulate the probability of death so that the developing risk picture more accurately depicts the future. The alternative simply assumes everyone age 54 will live to age 84 and ignores the mortality variation.

Contacting Pension Strategies Inc.

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Actuarial Services for Individuals

Pension Strategies Inc. is an independent actuarial consulting firm, working with a broad range of clients in the public and private sector across western Canada and into Ontario. Located in Cochrane, Alberta, Pension Strategies was founded by its Principal, Pat Johnston, an actuary with over 30 years of actuarial experience.

Our vision is to “Unleash the ‘science’ of actuarial work with the ‘art’ of understanding”. In meeting this vision, we have not only worked to bring the value of actuarial services to all our corporate and public sector clients regardless of the size of the organization, but to expand the availability of actuarial services to individuals.

We believe this level of actuarial service for individuals is simply not provided anywhere else in the country.

We will be introducing more innovative actuarial services for individuals over the next year.

Actuarial Services for Individuals Currently Provided by Pension Strategies Inc.

Individual Pension Plans: The complete range of actuarial and administrative services for designing, implementing, valuing and administering these plans;

Determination of the Capitalized Values of Pension Entitlements on Marriage Breakdown: Preparing an expert evidence report, suitable for submission to the courts, for the division of a pension on marriage breakdown under the appropriate family law act;

Determination of the “loss” of Members’ Entitlements Under Pension Plans: Report analyzing the loss, or potential loss, in future value of pension accruals. This report is most often used for members are considering alternative employment opportunities, or when settlements are being negotiated in cases of wrongful or early termination of employment;

Actuarial Analysis of Pension Accruals: Report projecting a member’s future pension entitlements under a defined benefit pension plan and analyzing the year over year growth in amount and value of projected pension, to assist the member in choosing the optimal retirement or termination date;

Actuarial Analysis — Pension versus Commuted Value: Report providing independent analysis of the respective value and risks for a member of choosing a pension or a commuted value - a choice faced by defined benefit pension members at the time of their termination of employment or retirement.

Actuarial Analysis — When Should You Start Your CPP: Analysis of the decision of when to start your CPP, reflecting the early retirement penalty if you start early, the late retirement bonus if you start late, the income tax effects and the effect of having post-retirement benefits.