

A Practical Approach to Retirement Planning

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It is very difficult for a person to plan for an event like retirement. This is the case since many would rather, or must, spend their money now. People think: "Why save money now that I may not spend for 30, 40, even 50 years. I can always save for retirement later." This paper introduces a retirement planning model that illustrates the importance of actively planning for retirement at as young an age as possible. Many important concepts associated with retirement planning are discussed.

Importance of Retirement Planning

Planning for retirement is one of the most important but more difficult tasks an individual or family can perform. Based on statistics from recent surveys, the vast majority of Canadians wish to retire prior to age 65. But only a small minority have developed a detailed plan that will allow them to realize their retirement dreams. For example, in recent surveys of Canadians, over 85% of respondents feel that saving for retirement is an important goal. But, almost half of respondents have never contributed to an RRSP and two-thirds do not have a formal, written retirement plan.

Statistics Canada reports that for the 2002 tax year, only 34% of eligible tax filers contributed to an RRSP. The median contribution was a modest \$2,500, only 9% of the allowable contribution room. In addition, only about 31% of the labour force are members of an employer-sponsored registered pension plan (RPP). The vast majority of these workers are public-sector employees. Only a small portion of private sector employees have RPPs. Therefore, while many Canadians wish to retire early, many will not be in a position to retire, even at age 65, given their lack of pension benefits and inadequate planning and savings. Many fear they will not have

enough money to live on in retirement.

To governments and Canadians under 40, these statistics must be a cause for concern. The generation of Canadians now under 40 will be entering or in their peak earnings years when the "baby boomers," individuals born between 1947 and 1965, begin to retire. Given that the "boomers" are roughly a third of the country's population, their retirement will mark the beginning of a major decline in the number of active workers to retirees in Canada. This may result in pressure on government to help pay for the retirements of the "boomers" who have not actively planned for retirement.

Planning would allow for a much easier life in retirement. Mentally, though, it can be difficult to do, especially for those in their 20s or 30s. If experience teaches us anything, however, it is that time is an important ally when saving money. The earlier a retirement plan is developed and implemented, the easier it is to actually meet the plan's goals. For example, a 25-year old wanting \$1 million at age 65 only has to save \$1,300 per year or \$85 per month, assuming a 12% average return on the investment in financial assets. On the other hand, a 45-year old must save \$13,900 per year or \$1,000 per month to achieve the same goal. Time, really, is on your side when you are young.

To retire and live in comfort, planning is essential. Those thinking government will fund their retirement had best plan to live a marginal existence. For those hoping to enjoy their retirement years, a plan and an early commitment to saving is vital.

Foundation Concepts Associated with the Retirement Planning Model

As discussed below, three important concepts form the foundation of the model:

1. **Time Value of Money and Real Rates of Return** – Retirement or other financial

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goals are often phrased in terms of a desired future financial position, for example, "We want \$40,000 in five years." The implication of such a statement is that the household wants \$40,000 of *today's* dollars in five years, not 40,000 of year five's dollars. Inflation impacts the analysis. If inflation averages 5% per year over the five-year period, then, the household wanting \$40,000 really requires \$51,051 in year 5 to have \$40,000 of today's dollars. An alternative view is that \$40,000 in year 5 is really only worth \$31,341 in today's dollars. For a long-term analysis like retirement planning, real dollars are used to compensate for the major impact inflation has on the resulting values. When using real dollars, a real rate of return (i_r) that adjusts for inflation is used; it is calculated as follows: $[(1 + i_n) \div (1 + f)] - 1$; where i_n is the nominal rate of return earned on the investment in financial assets and f is the inflation rate. Assuming a nominal return of 12% and inflation of 5%, the real rate of return is 6.67%.

2. **Source of Retirement Funds** – In retirement, there are only three sources of

TABLE 1
Retirement Planning Model

	Kim and Leslie #1	Kim and Leslie #2	Kim and Leslie #3
Savings Period (years)	12	16	16
Retirement Period (years)	30	26	26
Return: Saving Period	10.00%	10.00%	11.00%
Inflation: Saving Period	3.50%	3.50%	3.50%
Real Return: Saving Period	6.28%	6.28%	7.246%
Return: Retirement Period	7.50%	7.50%	7.50%
Inflation: Retirement Period	3.50%	3.50%	3.50%
Real Return: Retirement Period	3.865%	3.865%	3.865%
Yearly Income Needed in Retirement (Real \$)	\$75,000	\$75,000	\$72,500
Estimated Yearly Pensions (Real\$)			
Government Pensions (indexed)	\$5,000	\$7,000	\$7,000
Private Pensions (indexed)	\$35,000	\$40,000	\$40,000
Yearly Income to be Funded (Real\$)	\$35,000	\$28,000	\$25,500
Desired Estate at Death (Real\$)	\$400,000	\$400,000	\$250,000
Wealth Required at Retirement For:			
Yearly Income (Real\$)	\$615,286	\$454,187	\$413,634
Estate (Real\$)	\$128,238	\$149,241	\$93,276
Total Wealth Required at Retirement	\$743,524	\$603,428	\$506,910
Less: Wealth Available From:			
Current Wealth (Real\$)	\$5,000	\$5,000	\$5,000
Other Pensions: Non-Indexed	\$0	\$0	\$0
FV of Current Wealth	\$10,385	\$13,250	\$15,314
Plus: PV of Other Pensions	\$0	\$0	\$0
Wealth Available at Retirement	\$10,385	\$13,250	\$15,314
Wealth to be Funded	\$733,139	\$590,178	\$491,596
Yearly Savings (Real\$): End	\$42,752	\$22,464	\$17,269
Yearly Savings (Real\$): Begin	\$40,226	\$21,137	\$16,102
Monthly Savings (Real\$): End	\$3,424	\$1,791	\$1,364
Actual Yearly Savings: End			
Year 1	\$44,249	\$23,250	\$17,873
Year 2	\$45,797	\$24,064	\$18,499
Year 3	\$47,400	\$24,906	\$19,146
Year 4	\$49,059	\$25,778	\$19,817
Year 5	\$50,776	\$26,680	\$20,510

secure income: government benefits, pension plans, and individual savings. Government benefits include the Canada Pension Plan (CPP), Old Age Security (OAS), and Guaranteed Income Supplement (GIS). The GIS is only available to seniors with no other sources of income and while the OAS is paid to all individuals over 65, it is “clawed back” from “wealthy” seniors, those earning about \$58,000. For the Canada Pension Plan (CPP), the 1997 reforms that increased the contribution rate to 9.9% are now fully in place. The CPP appears to be financially sound and on track to provide retirement pensions well into this century. Even so, it is wise for retirees to plan on receiving retirement income from other sources.

There are two types of employer pension plans: defined benefit and defined contribution. For a defined benefit plan, the retirement benefit is based on: (years of work) times (a stated percent) times (an average level of income). The employer manages the invested capital and assumes all of the associated risk. The yearly pension benefit is often

indexed for inflation. With a defined contribution plan, both the employee and employer contribute a stated amount. But, since the employee manages the accumulating capital, retirement income is based on the employee’s investment choices and ability.

There are two types of individual savings: registered and non-registered. Registered retirement savings plans (RRSP) allow individuals to invest a stated amount each year in any type of financial security. The amount contributed is deducted from income for tax purposes, and income accrues tax-free. But all amounts withdrawn are fully taxed. Non-registered savings are simply funds that are earned but not spent and then invested in real or financial assets.

3. Choice of Investment Securities – For financial planning, many financial advisors recommend holding a diversified portfolio of common equity and debt securities, with the debt component becoming a higher percentage as one ages. The rule-of-thumb is that the equity component of the portfolio should be limited to 100%, less the person’s age. In

much of the period leading to retirement, however, this general investment strategy should be questioned for two reasons.

First, since retirement planning is long-term in nature, the retirement savings should be invested for the long-term. Research clearly shows that common equity based financial securities are the most attractive investment vehicle, over the long-term, given their ability to maximize returns while diversifying and controlling risk. For example, the average yearly return on the Toronto Stock Exchange (TSX) total return index over the period 1938 to 2002 was 11.3%. This was a 4.9% premium over the 6.4% return on long-term government bonds. The return on the S&P 500 Index, in Canadian dollars, over this 65-year period was 13.6%. To put these numbers in perspective, if, in 1938, an individual had invested \$1,000 in these indexes, by the end of 2002, the TSX investor would have \$945,563, the bond investor \$52,999, only 5.6% of the TSX investor, while the investor in the S&P 500 would have an astonishing \$3,501,170.¹

Second, to avoid the risk of outliving their money, most individuals should invest the majority of their retirement portfolios in equities. This may be considered risky where return volatility is the measure of risk. Over the short-run, common equity is more volatile. But, the TSX index recorded negative returns in only 17 of the 65 years between 1938 and 2002. As well, positive returns were earned over all 56 ten-year sub-periods over the total 65 years. Over the long run, volatility is not a major concern. The much higher return received on a diversified portfolio of equities more than compensates for the greater volatility. For most retirees, the real risk is outliving their money. To avoid this, most need to invest in quality equities to ensure they do not run out of money, before they run out of time.

Therefore, for retirement, it is logical to invest exclusively in common equity based securities during the savings period. During retirement, the household will begin to draw on the wealth available at retirement suggesting a portion of the portfolio must be converted into secure debt investments; for example, a mixture of treasury bills or money market funds,

GICs, and strip bonds. A portion of the portfolio will remain invested in equities since, even in retirement, the household's investment horizon is still long-term. Thus, the nominal return earned on the investment portfolio during the savings period will be greater than during the retirement period.

The Retirement Planning Model

The retirement planning model is displayed in Figure 1. The model assumes two time periods (savings and retirement) separated by retirement at time N. For the model, data on the following is required:

1. Yearly income required in retirement

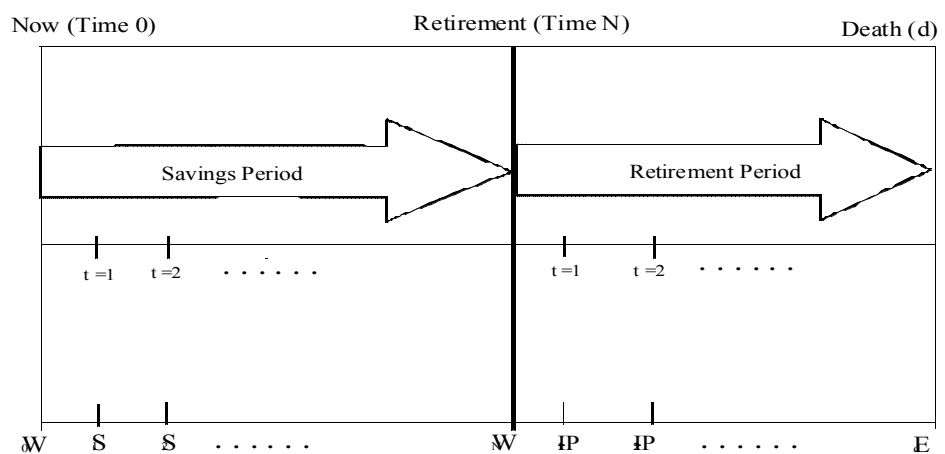
(in real dollars) – At retirement, a household's objective is to have sufficient money available to fund retirement at a certain level of income for a specific number of years. The income level needed is based on the particular living style and circumstances of the household. A rule-of-thumb often used is 70% of the pre-retirement yearly income. Recognize, though, this may be too little or too much for the particular requirements of an individual household.

2. Ages: Current, at retirement, and at death

– This provides the length of the savings and retirement periods. The first age is given but the latter two must be estimated. The age at retirement is a goal associated with the model. Age at death is based on expected life span of each member of the household. Statistics Canada (2003) reports that the average life expectancy for a male is 77 years while for females it is 82. These figures, with some margin of safety, could be used in the model.

3. Government and employer pensions (in real dollars)

– Offsetting some or all of the yearly retirement income is pension income, either from government or an employer. The current amount from government sources can be easily determined and these amounts are indexed to inflation. Employer pensions can be estimated based on the terms of the plan. If the pension is indexed, the amount is deducted directly from the yearly retirement income to determine the amount of yearly income that must be replaced by saving. If the pension is not indexed, the yearly amount must be discounted at



The model assumes two time periods separated by retirement at time N. The wealth required at retirement is calculated as follows:

$$W_N = \sum_{t=N+1}^d \left[\frac{I_t - P_t}{(1 + i_r)^{d-t}} \right] + \frac{E_d}{(1 + i_r)^d}$$

- where: W_N = wealth required at time N for retirement beginning at time N;
- I_t = before-tax real dollar income needed in retirement for each year t of retirement;
- P_t = before-tax real dollar indexed pension income available during each year t of retirement;
- d = number of years between age at retirement and age of death;
- t = specific year during the retirement period;
- E_d = desired value of estate at time of death;
- i_r = real rate of return earned on financial asset investments during retirement.

The above equation determines the real amount of income a household requires at retirement to fund a particular lifestyle during retirement and also leave an estate at death of a specific real dollar amount.

The amount that must be saved during the savings period is calculated as follows:

$$W_N = W_o (1 + i_r)^N + \sum_{t=1}^N [S_t \times (1 + i_r)^{N-t}]$$

- where: W_o = wealth available now for investment to fund retirement;
- i_r = real rate of return earned during the savings period;
- S_t = yearly saving in each year of the savings period;
- N = number of years between now and retirement;
- t = specific year during savings period.

In this case, W_N and W_o are known, so this equation is used to determine the real dollar amount of savings necessary during each year of the savings period to fund the retirement plan.

Figure 1. Retirement Planning Process

the nominal investment rate and a lump-sum determined at the point of retirement. For young people or those who change jobs, it may be difficult to determine the pension amounts. It must be recognized, however, that retirement planning is a long-term analysis that at any point in time is subject to error. This supports the view that retirement planning is a continuous activity, not a one-time event that is filed away never to be re-considered.

4. Nominal returns earned on investments during the savings and retirement periods and the rate of inflation during both periods

– During the savings period, it is

reasonable to expect an average nominal rate of return of, at least, 10%. During retirement, given the conversion of some equity to debt, the average nominal rate of return will fall, say to 7.5%. Inflation rates in Canada have fluctuated dramatically over the past 25 years, peaking at over 12% in 1981, but falling to the 1%-4% range since 1992, the period when target inflation rate ranges were established. Given the focus of all industrialized countries on controlling inflation, many believe that long-run inflationary pressures have subsided. Therefore, it seems reasonable to assume the long-run inflation rate will average 3.5%.

5. **Current wealth invested for retirement** – Value of funds currently invested for retirement.

6. **Desired value of estate at death** – The amount of real dollars required for estate planning purposes.

The wealth required at retirement and the saving necessary to accumulate this level of wealth can be calculated using the two formulas provided with Figure 1.

Illustrating the Model

Kim and Leslie, both 46, are planning for their retirements. Kim and Leslie both work for the federal government making a combined \$117,000 per year. They hope to retire when they are 58. Based on their current lifestyle and plans, they believe they require \$75,000 of retirement income. They wish to leave an estate of \$400,000 at their deaths. They are wondering how much they should be saving each year to fund their retirement plans. For their situations, the following assumptions are made.

Both Kim and Leslie will live for 30 years after retirement. Since they work for the federal government, they will receive employer pensions. Kim has only been working for the government for a few years, so their combined pensions will only be \$35,000. Each will receive an average of \$2,500 per year in government benefits over their total retirement period. The average nominal investment return will be 10% during the saving period and 7.5% during retirement. Inflation will average 3.5% over the total period. They currently have \$5,000 invested in RRSPs.

To develop a retirement plan, the first step is to determine the real dollar amount of money they require at 58, their planned retirement age. The real rate of return during retirement is 3.86% $[(1.075/1.035) - 1]$. The first component of the model is the discounted value of a constant amount (an annuity) of \$35,000 $(\$75,000 - \$35,000 - \$5,000)$ per year for 30 years. The second component is the value of the estate discounted for 30 years. Therefore, using the first formula in Figure 1, Kim and Leslie require \$743,524 of today's dollars in 12 years. To determine the amount they must save in each of the next 12 years, the real rate of return is 6.28% $[(1.10/1.035) - 1]$ and the yearly savings

component of the equation is an annuity. The result indicates that Kim and Leslie must save \$42,752 of today's dollars each year for the next 12 years to achieve their retirement goal.² Given that this is about 37% of their gross income, this plan is not achievable for Kim and Leslie. It is unrealistically high, especially when their basic lifestyle needs and their other financial goals are considered.

An important part of any long-term planning model is the ability to easily see the sensitivity of the initial result to changes in some or all of the key variables. Table 1 presents a spreadsheet template based on the model that can be easily changed for a household's particular circumstances. Readers are encouraged to download the spreadsheet model for their own use; it is available from the author's Web site at: www.upei.ca/~sbusines/faculty/hennessey/bus421.html.

The first numeric column is Kim and Leslie's initial position. For Kim and Leslie, a key factor driving the result is their early and therefore long period of retirement. Assume that after considering the initial results, Kim and Leslie modify their goal: they now plan to put off retiring until they are 62. This change has a significant impact on the plan as it lengthens the savings period and reduces the retirement period by four years, and increases the expected pension benefits received from the government and their employer. The second column in Table 1 indicates that the total monthly savings required declines by almost half to a more reasonable \$1,791. But given that this is still about 19% of their gross incomes, this level of savings may still be too high for Kim and Leslie to manage.

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ARO Welcomes Mary Cazzetta

Aro Inc. is pleased to announce the appointment of Mary Cazzetta to the position of Business Development Director in Ontario. This nomination is part of ARO Inc. plan to increase its presence in Ontario. Ms. Cazzetta has a distinguished career in servicing the areas of public and private sector across Canada. During the last 10 years she has worked with key clients to provide customized accounts receivable solutions. Prior to joining Aro Inc. she held various positions within the industry and brings with her a strong background in sales development. Ms. Cazzetta is a current member of the Financial Management Institute of Canada and member of the Municipal Tax Collectors of Ontario. She is a graduate of York University in Business and Commerce and has taken several undergraduate courses at York.



Founded in 1994, ARO Inc. has been operating across Canada with regional offices in Ontario, Quebec and British Columbia. ARO Inc. is licensed to operate in each Canadian Province and Territory and have more than 250 employees to service its clients.

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As a result, Kim and Leslie consider a third plan: reduce the required amount of before-tax income per year to \$72,500, reduce their required estate to \$250,000, and increase their expected rate of return during the savings period to 11%. The net impact is to reduce the required level of monthly retirement savings to \$1,364. Given that this is about 14% of their monthly incomes, this plan is likely achievable.

Kim and Leslie, given their ages, must routinely monitor their circumstances. If one of them loses or changes their job, or they experience unanticipated expenses, or they assume a high debt load for personal asset purchases, their goal may not be reached. Also, their retirement goals may change. As stated earlier, a retirement plan

needs constant fine-tuning; it should not be developed and then filed away, never to be reconsidered.

Conclusion

Retirement planning is something that can be easily neglected since, for many, it is more satisfying to spend now for enjoyment rather than save for a long-term goal, like retirement. Those doing so, however, may end up receiving short-term benefits at the expense of major long-term pain. ■

References

1. Similar or better returns could also be available from investing in a number of the top performing mutual funds. For example, since 1955, the Templeton Growth Fund's average annual return was 13.7% while, since 1981, the Trimark Fund's average annual return was 15.2%.
2. As discussed earlier, this amount must be adjusted each year for inflation to determine the actual amount that must be invested. If they wish to

begin saving immediately, the yearly savings required falls to \$40,226. On a monthly basis, the required amount of savings is \$3,424, again in real dollars.

Ipsos-Reid (2004). "Canadians' Retirement Savings Expectation," February 3, available at: www.ipsos-na.com/news/pressrelease.cfm?id=2040

RBC Financial Group (2003). "We're older and wiser about retirement savings," December 18, available at: www.rbc.com/newsroom/20031218rrsp.html

Statistics Canada (2000). "Pension Plans in Canada: Statistical Highlights and Key Tables," Catalogue no. 74-401-SIB, October 31.

Statistics Canada (2003). "Deaths: 2001"; The Daily, September 25; available at: www.statcan.ca/Daily/English/030925/d030925c.htm

Statistics Canada (2003). "Registered retirement savings plan contributions: 2002"; The Daily, October 23; available at: www.statcan.ca/Daily/English/031023/d031023b.htm

Statistics Canada (2003). "Canada's retirement income programs: 1990 to 2001"; The Daily, November 17; available at: www.statcan.ca/Daily/English/031117/d031117a.htm

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