Schroders

Secure cashflow for a secure retirement

The trend of mortality statistics in Canada has brought good news – Canadians are living longer. The implication for people considering retiring at age 65 is that they can expect to enjoy a long retirement. In fact, a male Canadian who has just retired, aged 65, will on average spend 19 years in retirement and a female 22 years. Further, 27% of males and 41% of females can expect to spend over 25 years in retirement.[1] Any improvement in mortality would obviously increase these figures further.

However, as we face the combination of a longer retirement and persistently low interest rates, it is unfortunately an inevitable conclusion that the vast majority of retirees won't be able to survive from investment income alone. Instead, participants will need to sell down their savings to meet spending needs and this will reduce the size of their savings over time.

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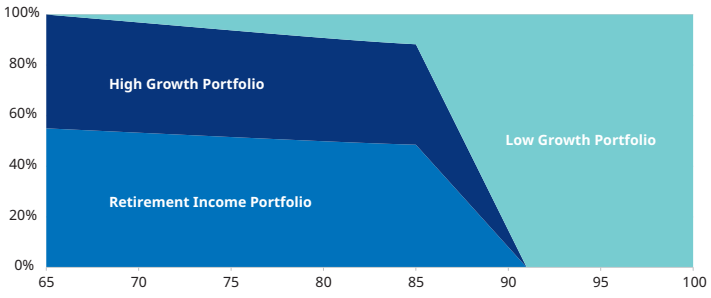
Typically retirees will need to continue to hold some growth assets in retirement alongside bonds to provide income. However, investing to meet a retiree's spending profile requires a different approach to traditionally-managed bond funds. **In particular, we believe that investing in a portfolio of bonds specifically constructed to meet a target spending profile could significantly improve participant outcomes.**

Overview

This paper will consider how a retirement income portfolio can be constructed to target a spending profile. The portfolio will use the income and redemption proceeds from a series of corporate bonds to meet the target profile. This means it should provide the required income with greater certainty, however it also means the value of the portfolio will diminish over time. The retirement income portfolio should therefore sit alongside a growth portfolio at the outset and then move into a lower growth diversified portfolio, as shown in Figure 1 below.

Figure 1: Illustrative asset allocation post-retirement



Source: Schroders. Glidepath shown is for illustrative purposes only and is not intended to serve as any recommendation to buy or sell any security.

We set out a new approach to constructing a retirement income portfolio:

1. First, create a target spending profile for Canadian retirees
2. Then, construct a portfolio of bonds designed to secure essential spending for the first 20 years of retirement
3. Incorporate real-return bonds intended to provide inflation-protection and secure a minimum asset value at age 85
4. Set a checkpoint at age 85, when a change of investment strategy will be needed, providing the option for members to annuitize.

We will show how investing in a portfolio of bonds constructed in this way can increase the probability of a participant maintaining sufficient assets for their entire retirement. We compare the approach to one of taking income and drawing down from a more traditional bond fund.

Step 1: Create a target spending profile for Canadian retirees

The first challenge is to determine the spending needs that the retirement portfolio will have to support, consider how flexible those needs are, and look at the impact of inflation. Once a clear purpose has been established, an optimal portfolio can be designed to meet these objectives. This requires analysis of retiree consumption and also how that consumption changes over time as the participant ages, their spending patterns change and prices of the goods and services they consume change.

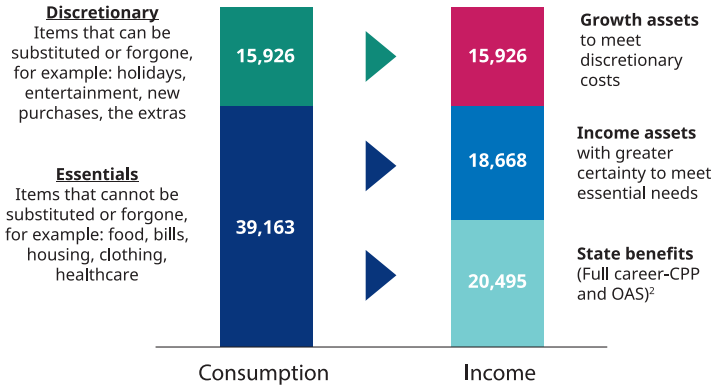
Statistics Canada publishes data on the median level of household expenditure for people over the age of 65. Using these data, it is possible to break down a retiree's spending into what might be deemed essential expenditure (e.g. food

1 Statistics Canada 2011 to 2013 life tables and Schroders' calculations.

and heating bills) and what might be considered discretionary (e.g. holidays). If more data were available it might be possible to further customise this categorisation according to the spending profile of a specific group of retirees or even for an individual participant.

Figure 2 shows spending divided between essential and discretionary for a median retiree household. This division is important for setting investment strategy because a retiree will need to ensure that, at the very least, they have sufficient savings to cover essential expenditure (after allowing for what will be met by state benefits and other savings). The investment strategy to cover essentials should include lower risk investments, such as bonds. Discretionary spending is, by definition, more flexible, allowing retirees to invest in growth assets in the expectation that they could generate higher returns over time and have a higher level of consumption. The trade-off here is that retirees would need to reduce discretionary spending if growth assets underperformed.

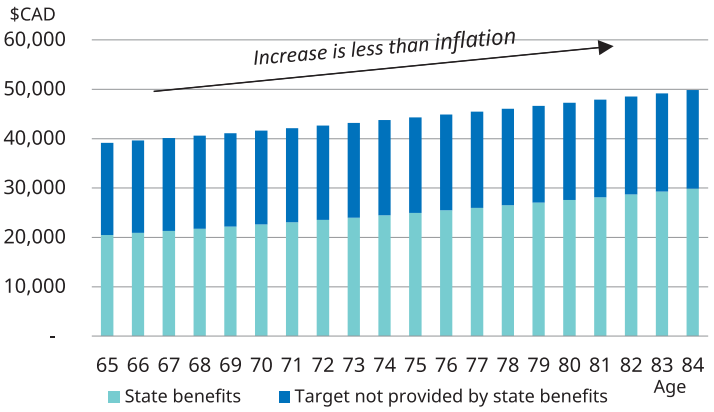
Figure 2: Dividing up retiree's essential and discretionary spending



Source: Statistics Canada, CANSIM database, median Canadian retiree from Table 203-0026 – Survey of household spending (SHS), household spending, by age of reference person, annual (dollars), and Schroders.

We will now consider the development of essential spending in order to derive the required payment profile for a retirement income portfolio. This is set out in Figure 3.

Figure 3: A typical retiree's essential spending from ages 65 to 84



Source: Schroders. For illustration only.

The target spending increases by less than general inflation

The amount of essential spending increases each year by an amount that is slightly below general inflation. There are three key factors that drive this shape:

1. Evidence suggests that Canadian retirees typically increase spending more slowly than inflation during retirement

There are a number of research articles and publications which point to the fact that, on average, Canadian retirees typically increase spending at a lower rate than inflation as they age. Reasons given for this include: deteriorating health meaning less spent on travel, the death of a spouse or close friends making it difficult (or less interesting) to spend money on entertainment[3] and the fact that the government or relatives may increasingly provide basic necessities as health deteriorates. For example, 8% of all seniors live in collective dwellings with over half of these residents 85 years of age or older, while 16% of senior women and 7% of senior men live with other families, mostly relatives.[4]

Of course, another reason for this modest rate of increase in spending may be involuntary: retirees may be economising because their savings are running down too quickly. If this were the case, then a spending profile with a modest increase might not be desirable. However, the statistician Philip Cross points to research from Malcolm Hamilton, a former consultant and retirement specialist, which documented that older seniors save more than younger seniors.[5] This was based on data from Statistics Canada's Survey of Household Spending, which notes that those over 85-years old typically save or give away 18.6% of net income. This therefore, supports the argument that the more modest increases in spending in retirement is voluntary and better reflects desired spending.

A caveat to this argument is that spending on healthcare will typically increase as people age. Although this is true, the impact on total spending of Canadian retirees is lessened by the Canadian healthcare system. However, we do recognise that there is increasing uncertainty beyond age 85 and that the individual consumption needs of different retirees at older ages may vary widely.

We have therefore initially considered only the first twenty years of spending and assumed that spending will decline in real terms in setting the target spending profile during retirement. The rate of increase we have used is 1.0% p.a. below inflation[6] and we have applied this to both essential and discretionary expenditure.

2 The Canadian Pension Plan (CPP) provides contributors and their families with partial replacement of earnings in the case of retirement, disability or death. Almost all individuals who work in Canada outside Quebec contribute to the CPP. The Old Age Security (OAS) pension is a monthly payment available to seniors aged 65 and older who meet the Canadian legal status and residence requirements.

3 Fred Vettese, "Why Canada Has No Retirement Crisis", Rotman International Journal of Pension Management, 6 (1), Spring 2013.

4 Anne Milan, Irene Wong and Mireille Vézina, 2014, "Emerging trends in living arrangements and conjugal unions for current and future seniors", Insights on Canadian Society, Statistics Canada, February 2014.

5 Philip Cross, The Reality of Retirement Income in Canada, Fraser Institute, April 2014, citing Malcolm Hamilton in "The Financial Circumstances of Elderly Canadians and the Implications for the Design of Canada's Retirement Income System", in The State of Economics in Canada: Festschrift in Honour of David Slater, edited by Patrick Grady and Andrew Sharpe, John Deutsch Institute for the Study of Economic Policy and McGill-Queen's University Press, 2001.

6 Schroders' estimate using McKinsey & Company "The McKinsey Retirement Readiness Index" & Statistics Canada data.

2. State benefits are inflation-linked

Working on the basis of a full working career in Canada, we assume that state benefits can be used to cover a proportion of the essential spending. As state benefits increase in line with inflation (whereas total spending declines in real terms), these payments should be able to cover an increasing proportion of essential expenditure over time. For the purposes of determining a suitable cashflow profile, this means the portfolio covering essential expenditure will need to provide for a declining proportion of total expenditure, in real terms.

3. Canadian retiree inflation is similar to CPI

Our analysis of the consumption basket for Canadian retirees shows that the composition is very similar to that used in calculating the Consumer Price Index (CPI). It is therefore unsurprising that inflation for Canadian retirees over the last 20 years has been very close to general inflation, i.e. 1.84% versus 1.82% respectively.[7] This makes us think that CPI is a reasonable proxy for the inflation experienced by Canadian retirees. If we assume that CPI is 2.0%, then this is what drives the upward sloping profile in nominal terms (shown in Figure 3).

Target capital remaining after 20-year period

Our income profile is designed to cover the first 20 years of active retirement, which runs close to the average current life expectancy of a Canadian retiree. However, 48% of males and 62% of females currently live beyond 85. The experience of each of these surviving retirees is likely to be very different. One way to illustrate this is that, while on average participants who get to this age could live for another seven years, about 7% of participants can be expected to pass away in the first year (compared to just 1% at age 65).[8] This makes it increasingly difficult to specify a target spending profile at this age and therefore a different approach must be taken.

We have therefore set a target for the remaining wealth at age 85 rather than an explicit spending profile. We target providing sufficient capital to maintain the level of spending at age 85 in real terms up until the average life expectancy of a current 85 year old. The target would be set at a level is consistent with the participant's estimated future consumption needs at this age which, based on our analysis, are about 20% lower in real terms than at age 65.

A final additional check is that we should ensure that the target profile and income withdrawals are not lower than the minimum withdrawal amounts required by tax-privileged Registered Retirement Income Funds at the different ages of a participant's life.

With the essential spending profile we have created, we can now construct an investment approach which aims to deliver these payments with high certainty. We have broken this down into three stages: one which targets delivering the payments in the first 20 years of retirement, one which seeks to protect against inflation and preserve purchasing power at age 85, and finally a "default" portfolio for age 85 and beyond.

7 Thomson Reuters Datastream and Schroders, June 2017.

8 Statistics Canada 2011 to 2013 life tables and Schroders' calculations.

Step 2: Construct a portfolio of bonds designed to secure essential spending for the first 20 years

Annuities might seem like a natural investment option for retirees wanting certainty of income and, indeed, some retirees will choose to purchase an immediate annuity at retirement for the security it provides. However, there are a number of drawbacks with annuities, such as:

1 They will not match the typical retiree's declining profile of spending requirements. (As an aside, this may be one factor to explain the observed rise in savings rates of older retirees.)

2 They are illiquid and the retiree is therefore exposed to the risk of not being able to access cash for an emergency, such as unexpected healthcare costs

3 They end on death with no value remaining, which is of course the flip side of the longevity protection they provide.

These drawbacks lead many individuals to pursue an alternative investment approach based on a post-retirement investment strategy. We consider three possible investment strategies that aim to provide a reasonable level of certainty about the income they generate:

1 Investing in cash and drawing income and capital

2 Investing in a standard corporate bond fund and taking income and drawing down against the capital

3 Investing in a retirement income fund comprising bonds whose maturities are chosen to secure the required payments to meet the spending profile.

In practice, an income portfolio may wish to include government and quasi-sovereign issuers, which can offer a greater range of maturities and improved liquidity. However, we assume that the portfolio as a whole, would seek to target some return above that available from government bonds alone. It is also possible to consider non-bond-related strategies, but these generally suffer from lack of clarity about income and/or liquidity.

None of the strategies we consider provides an explicit linkage with inflation, but the retirement income fund can be constructed to meet the shape of a spending profile that increases annually by inflation of 2.0%. This works in a similar way to indexed annuities, which provide a fixed percentage uplift of income each year. In theory, inflation protection could be achieved by investing in a series of Canadian government real return bonds that match spending requirements. However, there are a number of drawbacks to Canadian government real return bonds. In particular, they are not very liquid, which makes trading them difficult, and they are only available at a limited number of maturity dates.

To provide a simple example, in Figure 4 we show how each of our possible strategies can be used to meet a single payment of $100 dollars in 10 years time. The example assumes that the retirement income fund secures the necessary payment by investing in a diversified portfolio of 10-year corporate bonds.[9] The only risk of not receiving the payment is, therefore, if any of the bonds default, so some prudent allowance needs to be made for defaults at the outset. The additional risk for a traditional bond fund is that it has to be sold at an unknown

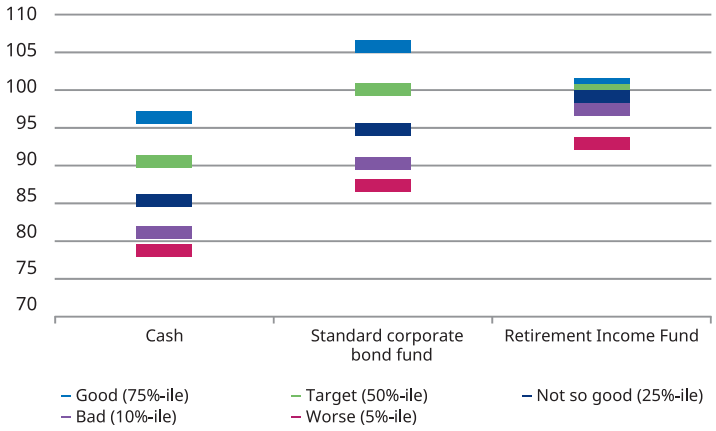
9 For simplicity we assume a zero coupon bond, however in practice the portfolio will be meeting more than one payment and therefore both income and redemption proceeds can be used.

market value to provide the payment in year 10. So, although both strategies start with the same $78 and reach the required $100 dollars in the median outcome, there is much greater certainty of receiving the payment with the retirement income fund, as shown by the narrower range in possible outcomes.

Unsurprisingly, due to the lower expected return, cash does not reach the target of $100 over the 10-year period. More surprisingly, cash does not offer the same certainty of return over the period. This is because there is uncertainty over the return on cash (i.e. the interest rate) over the 10-year period.

Figure 4: How different investment approaches narrow the risks

Investing for a $100 payment in year 10, starting with $78



Source: Schroders. The hypothetical results shown above are for illustrative purposes only. Actual results would vary. Please refer to the back of this report for important information.

A summary of the different drivers of risk in each strategy is shown below:

	Drivers of uncertainty			
Strategy	**Changes in inflation**	**Changes in interest rates**	**Changes in credit spreads**	**Defaults**
Cash	Yes	Yes–impacts investment return	No	No
Standard corporate bond fund	Yes	Yes–although fixed interest, changes will impact market value of the bonds and therefore the vale of the portfolio when it is sold to meet cashflows	Yes	Yes
Retirement income fund (buys the cashflow)	Yes–although can be constructed to target a higher cashflow that matches a fixed break-even inflation over the period	No*	No*	Yes

* Requires holding to maturity

In practice a series of bonds would be held to meet the target spending profile for each of the years between ages 65 and 85. In addition, as participants would likely draw income month to month the portfolio should hold sufficient liquidity to meet provide these regular payments.

We note that one of the key challenges of including the Retirement Income Portfolio is that whilst it should be effective in securing income, the market value may be subject to more volatile swings in value as long-dated interest rates and credit spreads change. In other words, whilst the ultimate outcome is more certain, the journey could be volatile. This impact is lessened at an aggregate level by the retirement income portfolio being only part of the post-retirement portfolio. Nevertheless, we believe that having appropriate and clear communications to retirees are very important to address this issue.

Step 3: Incorporate real-return bonds to provide inflation protection and help preserve the real value of the wealth at age 85

As discussed earlier, Canadian government real return bonds have attractive properties because they are able to protect against inflation eroding the purchasing power of retirement savings. One benefit of the retirement profile we have set out in Step 1 is that a proportion of the capital needs to be retained to secure income beyond age 85. This needs to be protected from inflation during the first 20 years of retirement and so is a natural part of the portfolio in which to include real return bonds.

Incorporating long-dated real return bonds should also provide a good hedge for income in the years beyond age 85. If a participant wishes to annuitize at this age, the portfolio should approximately reflect the changes in annuity pricing as a result of changes in long-dated interest rates.

As state benefits provide some inflation protection, they reduce the extent to which explicit protection is needed in the portfolio set aside to meet essential spending. We therefore believe that the combination of the corporate and quasi-sovereign bonds portfolio and real return bonds provides a neat solution to the twin problems of delivering the target income profile for the essential spending portfolio and protecting against inflation.

Step 4: Incorporate a checkpoint at age 85 and set a new investment strategy

A change of investment strategy is required to deliver income after age 85, due to the lack of a clear spending profile beyond this age. As there is no longer an explicit cashflow profile to manage against, the aim should be relatively stable returns with a low risk of significant drawdowns.

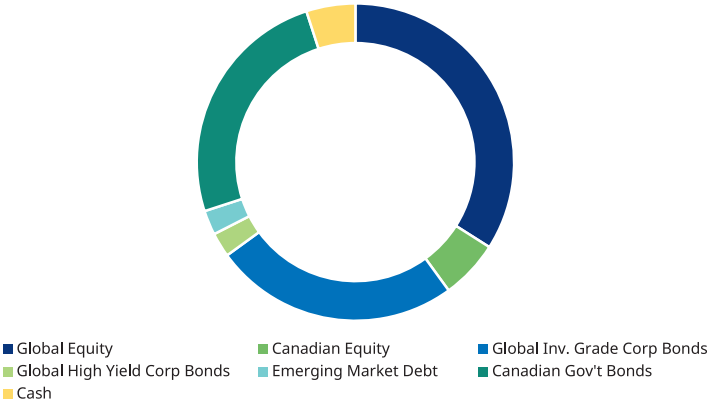
One approach is for the participant to choose to annuitize at this age, which would provide a guaranteed income for remaining life. Annuitizing might be increasingly attractive at this age for a number of reasons. In particular, the yield enhancement available on annuities due to "the mortality credit" earned by older survivors becomes larger, making them potentially more attractive than other financial assets with similar market risk, such as bonds.

However, the flip side of this is that there is the risk of loss of a significant proportion of a retiree's savings on early death with an annuity. An increasing risk of unforeseen medical expenses

may also make annuities less appealing due to lack of liquidity. A further risk comes from delaying the annuity purchase until 85 as improvements in longevity between the ages of 65 and 85 could increase the previously budgeted cost.

On balance some participants will still decide to purchase an annuity. However, others who have a higher risk tolerance or want to maintain greater liquidity may wish to pursue a different strategy. One option would be to invest in a lower-risk diversified portfolio. An example, which maintains a large allocation to bonds, is shown in Figure 5.

Figure 5: A possible lower-growth, lower-risk portfolio for late retirement



Source: Schroders. The hypothetical allocation does not reflect any actual portfolio and is intended for illustrative purposes only.

We note that, in practice, it may be increasingly difficult to make decisions at this age as cognitive ability and/or health are likely to have declined. In order to remove the need to make an active decision at an advanced age, it might therefore make sense to incorporate such an approach into a post-retirement solution as a default option at 85. This logic would suggest that advisers and pension plans should engage in discussions with retirees over their options at an earlier age.

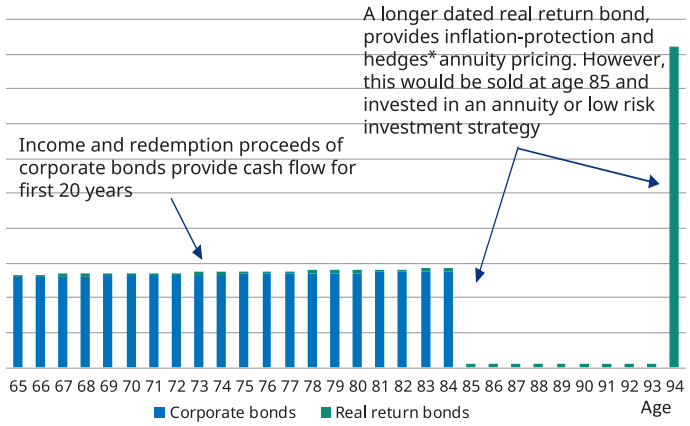
Impact on participant outcomes

As a final step, the retirement income fund would need to be accommodated among the total assets of the retiree alongside the broader growth portfolio ("Growth Assets") shown back in Figure 1.

Using the asset allocations in Figure 1, we compare two strategies, one which invests in a standard corporate bond fund and one which includes the retirement income fund. We assume that both strategies start with $900,000 at retirement (accumulated over a full working lifetime), and that 6% of this is withdrawn for the first year's income ($54,000). Reflecting our work on retirees' consumption patterns, the withdrawals increase slightly below inflation for the first 20 years and then in line with inflation after that.

Unlike the standard corporate bond fund, the retirement income fund does not need to sell bonds to meet the cashflow target. Instead, the payments are secured through maturing bonds, as discussed previously. This is illustrated in Figure 6.

Figure 6: Cashflow profile of retirement income fund if held to maturity

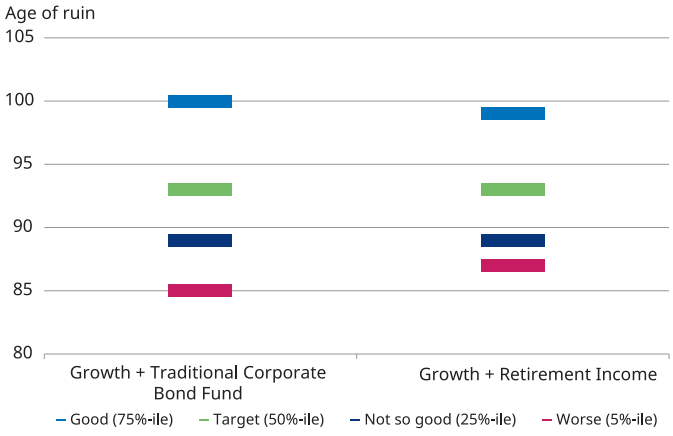


Source: Schroders. The hypothetical results shown above are for illustrative purposes only. Actual results would vary. Please refer to the back of this report for important information.*The portfolio aims to broadly reflect changes in annuity prices for changes in real interest rates, however will not perfectly track annuity pricing and will not hedge changes in annuity pricing for other factors e.g. longevity.

Figure 7 shows the age at which the amount of savings would fall to zero under both strategies ("age of ruin"). In practice, we believe that a retiree would adjust their consumption before this point, unless it was felt that state provision was sufficient. However, the analysis in the chart is a useful way to compare the potential performance of the alternative strategies.

It can be seen that the level of savings in both strategies falls to zero at age 93 in the median outcome. However, the retirement income fund has lower risk, which is reflected in the improved downside scenarios. In the lowest five percent of potential outcomes, the retirement income approach would run out of money by age 87 as opposed to 85 for the traditional approach. These two years of additional consumption would be extremely valuable to a retiree who survives to this age.

Figure 7: Age of ruin



Source: Schroders. The hypothetical results shown above are for illustrative purposes only. Actual results would vary. Please refer to the back of this report for important information.

Conclusion

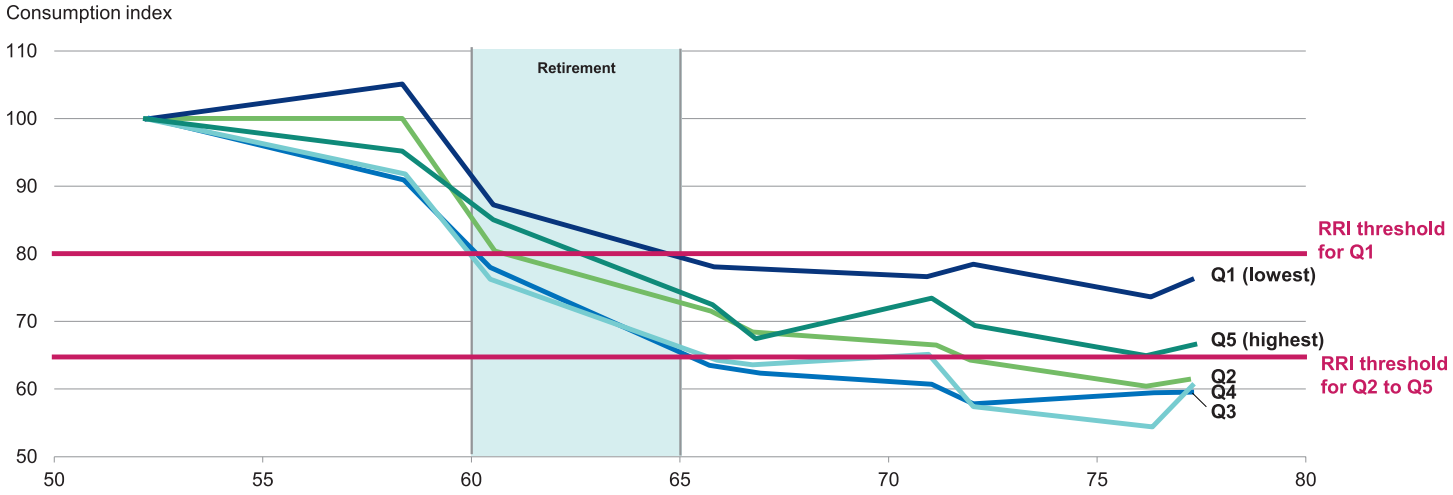
Faced with the prospect of a longer retirement and persistently low interest rates, it is almost inevitable that most retirees will not be able to survive on investment income alone. This reality requires a change in investment approach from the traditional one of taking an income and drawing down against a bond fund. Instead, a portfolio of bonds can be specifically designed to meet a retiree's essential spending profile using a combination of interest income and redemption proceeds. Balancing such a portfolio with other growth assets may help significantly improve the probability of a retiree maintaining sufficient capital to maintain a comfortable retirement, while not outliving their savings.

Appendix

Consumption in Retirement

Consumption in retirement for Canadian cohorts born between 1924 and1938

Indexed to 100=consumption at age 50-55



Source: Mckinsey & Company, Statistics Canada, "Building on Canada's Strong Retirement Readiness", February 2015

A word about simulated returns

Any hypothetical/simulated results shown must be considered as no more than an approximate representation of a portfolio's performance, not as indicative of how it would have performed in the past. Simulated returns are the result of statistical modeling, with the benefit of hindsight, based on a number of assumptions and there are a number of material limitations on the retrospective reconstruction of any performance results from performance records. For example, it may not take into account any dealing costs or liquidity issues which would have affected a strategy's performance. There can be no assurance that this performance could actually have been achieved using tools and data available at the time. No representation is made that the particular combination of investments would have been selected at the commencement date, held for the period shown, or the performance achieved. This data is provided to you for information purposes only as of the dates of this material and should not be relied on to predict possible future performance. There can be no guarantee that these or any simulated results will occur in the future, generate a positive return or protect against loss of principal.

Actual investor results will vary. Investors cannot invest directly in any index. All investments, domestic and foreign, involve risks including the risk of possible loss of principal.

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