Retirement Savings and Retirement Consumption: Incentives-Based Analyses of Supposed Anomalies

Marvin Avery & Richard J. Morrison

May 2011

Ruthen
17 Trevor Crescent
Ottawa, Ontario
K2H 6H7 CANADA

richard.morrison3@sympatico.ca
(613) 829-8900

A paper prepared for the June 2011 International Microsimulation Association meetings in Stockholm, Sweden

Abstract:

Analysts note that, with the decline of defined benefit pension plans, one of the most pressing needs of retiring Canadians is responsible advice on how to spend down their retirement portfolios. The exploratory Ruthen-1 microsimulation model directly addresses this financial literacy challenge. It calculates the distributions of outcomes associated with alternative draw-down strategies, this in the face of complex tax/transfer systems, and the inherent uncertainties associated with inflation, mortality, and investment returns. The Ruthen model is atypical in its focus on the outcomes and incentives relevant for individual retirees, rather than for government policies. This approach enables it to generate incentives-oriented results for a variety of recurring policy issues associated with major retirement “anomalies.” Following a summary description of the Ruthen-1 model, the paper provides illustrative analyses for several such issues.

• “Use it or lose it” – choosing how fast to spend retirement savings to optimize lifetime consumption
• “Gaming the system” – choosing how to hold wealth to improve consumption in retirement
• “How much difference do retirement assets make?” – measuring how much difference a given level of retirement savings makes to one’s consumption in retirement
• “Is retirement saving worth the cost?” – deriving lifetime internal rates of return on retirement saving
• “Retirement saving: cui bono?” – assessing government sector returns to individuals’ saving for retirement

The Ruthen results suggest that there may be powerful systemic incentives leading to the saving and spending behaviours that appear to cause so much frustration for governments, financial institutions, and financial advisers. These results may generalize to other countries.
Introduction:

Traditional longitudinal dynamic microsimulation models, hereinafter “trads,” and personal longitudinal dynamic microsimulation models such as Ruthen are akin to fraternal twins. They share a common heritage, but they exhibit sufficient differences to make them quite distinct. Both of them simulate financial flows for individuals and governments over time using a mix of thousands of parameters and millions of pseudo-random deviates to build financial series. Both focus on the derivation and presentation of alternatives, with the goal of making informed decisions. Validation techniques are similar, as are outputs that comprise a mix of distributions, measures of central tendencies, and extreme cases.

But as with fraternal twins, trads and Ruthen display significant differences. Where trads carry a large representative population forward through time, Ruthen simulates many, usually millions, of independent lifetimes for a single subject. Thus, the most important difference is that trads are policy models with governments or research institutes as their clients; in contrast, Ruthen seeks to help its clients, individuals, make informed financial decisions in areas such as saving for retirement, and spending down their accumulated assets during retirement. For trads, the traditional focus lies with examining the impacts of policy alternatives, either relative to the existing system, or to a competing proposal. Such models count winners and losers, examine the sizes of the gains and losses, and aggregate those impacts to produce overall totals and impacts for significant subpopulations and for governments. For Ruthen, the focus rests with deriving the likely central tendencies and distributional impacts for alternative savings and dis-savings strategies, taking the tax and benefit systems, and economic parameters, as givens. Ruthen’s clients can then choose strategies that, all things considered, tend to produce preferable outcomes.

Ruthen analyses focus on individuals and their personal financial decisions. They do not directly address government choices about the desirability of one tax or benefit policy or another. Thus, one might well be sceptical that models such as Ruthen could have anything to contribute to government policy making. We argue here that, despite its focus on individuals, Ruthen may be able to assist government policy making for tax and benefit programs by illustrating the incentives and outcome sets that its subject individuals face. If nothing else, such analyses may contribute to a better understanding of the incentives for individuals, and of possible reactions to changes in tax and benefit programs. The analogy, though in a longitudinal context, lies with governments’ use of policy models such as Canada’s MAPSIT model or NATSEM’s Australian ETR (effective tax rate) model. Those models calculate the effective marginal tax rates that individuals and families face, e. g., as they earn more, as one input into policy design. Similarly, Ruthen calculates the longitudinal incentives for individuals as they spend down their retirement savings.

In this paper we illustrate Ruthen’s potential utility for policy decisions by presenting some Ruthen analyses that examine a few retirement savings issues that have long bedevilled governments. Specifically, we address issues such as how quickly one “should” spend down one’s accumulated retirement savings, and how much difference the individuals’ retirement savings actually make in the form of increased consumption in retirement. We offer a first-pass quantification of an individual’s lifetime-based internal rate of return on her voluntary retirement savings. Moreover, we generate the counterpart measures for the government sector’s internal rate of return on those same voluntary retirement savings. We believe that these analyses offer useful insights into the reluctance of some individuals to save for retirement, and the tendency of others to spend down their retirement savings “too quickly.”
The Ruthen Model:

Avery and Morrison (2009) provide a detailed description of the Ruthen model, including its structure, inputs, outputs, and illustrative applications. Consequently, we provide only a brief summary here. The version of Ruthen, Ruthen-1, used in this paper focuses on helping retirees decide how to spend down their retirement assets. Increasingly, individuals enter retirement with a portfolio of assets that is expected to provide a major portion of their consumption during retirement. There may also be entitlements to government or employer pensions, or to income-tested benefits, but individuals’ retirement savings are often called on to fund a major portion of their retirement consumption.

Personal Focus

In contrast to trads, which address issues of importance to governments, Ruthen is personal. It develops analyses for an individual’s specific situation; it starts with his/her particular mortality expectations, employer and government pension entitlements, and mix of registered and non-registered savings, and the level of unrealized capital gains within them. As with trads, Ruthen incorporates uncertainty with respect to when the individual dies, but uses mortality probabilities that may be higher or lower than those in standard mortality tables. In contrast to most trads, Ruthen’s simulations incorporate not only the individuals’ wealth, but also the returns to them, as well as the uncertainties about those returns, with varying year to year increases or decreases in portfolio values. Within these fluctuations, Ruthen treats the mix of returns from the portion of the portfolio not yet spent: interest, dividends, and capital gains, and the dynamics with which capital gains are realized for tax purposes. Ruthen tracks all of the relevant flows, including the consequences of drawing down the portfolio, within the context of the broader tax and transfer system. This allows it to simulate the individual’s consumption, as opposed to just his/her income, year by year. Beyond this, it also permits the calculation of the tax consequences for the government sector, the impacts on heirs, and the fees received by financial managers. Simulating millions of independent lifetimes for the subject individual, Ruthen derives the distributions of outcomes associated with the individual’s decisions regarding how to draw down his/her retirement savings.

In one of its major features, Ruthen characterizes those drawdown decisions as strategies – basic rules indicating how much is to be drawn down in any given year. Such strategies are central to Ruthen’s operation. They involve choosing, independently for registered and non-registered savings, what amounts will be annuitized, what portions will be drawn down using commonly prescribed formulae, or over specific numbers of years. Ruthen’s parameters permit an analyst or adviser to tune the operation of these strategies to reflect a wide range of approaches to spending down retirement savings. As anticipated, the choice of drawdown strategy has major implications for the individual’s finances and for his/her consumption in retirement. Members of the financial management community, e. g., Côté (2010), have argued that intelligently spending their retirement savings is one of the most serious challenges that current generations of retirees face. Indicative of this importance, the Society of Actuaries has recently funded a major literature review on the topic, MacDonald et al. (2011).

Ruthen Outputs

In terms of assessing the implications of retirement asset drawdown as an input to decision making, Ruthen provides a considerable array of outputs. The level of detail in the simulations makes this spectrum possible. Quite non-comprehensively, they include lifetime and age-specific values for real and nominal average consumption and discounted consumption, and the distributions about these averages. They include the likelihood of using income-tested benefits, the fraction of retirement years receiving those benefits, and the age-specific average amounts of such benefits received. They include a variety of taxes paid, distributed by age and by level of government, including the taxes at death for probate and the realization of capital gains and the liquidation of registered plans.
Figure 1 shows a particular subject’s average age-specific consumption for a variety of drawdown strategies, comparing all of them against the consumption pattern for the same individual with no savings. Naturally, these results depend on assumptions about the level of the portfolio brought into retirement, the returns to unspent funds, and the rate at which the returns become taxable, as well as her particular entitlements to government and employer pensions and the details of the tax and transfer system.

Given this paper’s focus, and the limited objective in including these results, it is neither necessary nor appropriate to discuss the detailed interpretation of the figure. In brief, the figure shows the longitudinal patterns of average consumption for several different drawdown strategies, as well as the corresponding consumption when there are no retirement savings. The 4% and 5% lines correspond to spending 4% or 5% of the portfolio the first year, and then indexing those amounts in each subsequent year, until the individual dies or exhausts the portfolio. The annuities line assumes full annuitization of both the registered and non-registered portions of the portfolio. The “Exhaust by” approaches assume that the individual will withdraw roughly equal real amounts designed to exhaust the portfolio by the given age, e.g., by the end of the expected disability-free life, or by expected age at death. The bottom portion of the figure indicates the subject individual’s probability of being alive at any given age, i.e., the probability that the values in the top portion are relevant.

The broad results from this type of analysis are clear. Avery and Morrison (2009) show that retirement consumption depends very strongly on the drawdown strategy used, both for total real consumption and its distribution over the subject’s lifetime. The strategies that yield the highest total real and average lifetime consumption values are those that draw down the retirement savings aggressively, even though such strategies may result in running out of money before death. Depending on a subject’s preferences for consumption, its timing across retirement, her/his conservatism in managing finances or aversion to depending on income-tested benefits, and with respect to the likely size of the estate left to heirs, an individual may have different preferences across sets of possible drawdown strategies. Ruthen-1’s purpose is to project the multi-dimensional distributions of outcomes likely to flow from pursuing any...
given drawdown strategy, allowing clients to choose the strategies that best achieve their objectives. Its outputs inform and serve individual retirees rather than their governments.

**Potential Ruthen Contribution to Policy Development**

Nonetheless, we have written this paper to show how Ruthen, despite its focus on personal financial decision making, can provide some useful inputs to the policy process. For this purpose, we illustrate several instances of that policy applicability, rather than developing a more comprehensive analysis of any given issue. The numerical results that we present necessarily depend on a variety of assumptions, and hundreds, if not thousands, of parameters. For example, they depend on mortality assumptions, and on the assumed distributions for inflation and the real rates of return on assets. They depend on the multitude of numerical values used in the calculation of taxes and benefits, and on whether these values are indexed for inflation. We have attempted to use reasonable values or ranges, guided by historical averages and the opinions of financial management professionals, but our success in this effort is not particularly critical to the paper’s objective of illustrating how individual level analyses might assist policy analysis. Along with this choice of assumptions and parameters, the results developed here depend quite heavily on the strategies that individuals use. Our examples will use several different types of strategies.

One thing this paper quite definitely does not do is to showcase Ruthen’s full range of features. For the purposes of these examples we have used the “central tendencies and minimal distributions” approach typical of most policy analysis. This paper’s illustrations do not, for example, deal with the distributions of lifetime consumption, or of consumption by year of age, although Ruthen automatically produces them. Neither do they exercise Ruthen’s capacity to break out specific taxes or income sources by year, or to generate statistics on the use of income-tested benefits. Nor do they take advantage of Ruthen’s capacity to apply different drawdown methods to different portions of the portfolio brought into retirement, varying the mixes of methods independently for the registered and non-registered portions. Instead, most of this paper’s illustrations concentrate on simple “monolithic” strategies for saving and drawing down savings, applying a common method to both the registered and non-registered savings.

The paper’s illustrations concentrate on the incentives that emerge when one compares the results of alternative strategies. We argue that these incentives and comparisons provide some useful insights into retirement savings behaviours that have consistently troubled governments. More specifically, the issues and behaviours we address include incentives to spend down one’s retirement savings relatively quickly, the relative advantages of holding retirement assets in registered versus non-registered forms, as well as how much difference one’s retirement savings actually make to one’s consumption in retirement. Finally, we provide a preliminary analysis addressing, financially, the utility of saving for retirement, this from the dual perspectives of both the individual doing the saving, and the government sector.

**Use It or Lose It**

**The Issue:**

With the declining incidence of defined benefit pension programs, there is an increased tendency for individuals to enter retirement with pools of assets from defined contribution plans and personal savings. Society, governments, and the retirees expect these assets to play a major role in providing retirement their income. Based on our discussions with government policy analysts in Canada, and with analysts in other countries, particularly Australia and the United Kingdom, a recurring source of frustration on the part of governments is the rate at which some retirees spend down their retirement savings. In particular, from the perspective of the government analysts, too many retirees are spending down their retirement portfolios too quickly.
There are several consequences for governments of a too speedy a drawdown. Retirees are more likely to exhaust their savings before death, leading to higher program costs for a variety of income-tested benefits. With portfolios declining faster, the total taxable returns to those portfolios are smaller, implying reduced tax revenues on those investment returns. As well, there are, on average, smaller estates, resulting in a corresponding reduction in probate and estate taxes. On the other hand, with increased consumption early in retirement, government sales tax revenues come in sooner, unrealized capital gains are realized and taxed sooner, and registered savings are taxed sooner on their withdrawal from the registered accounts.

There are also consequences for other relevant parties. For the individuals themselves, there are potential problems with consumption that is uneven across their retirement years, particularly as regards the lack of financial reserves in later life. To the extent that inheritances are seen as desirable, at least by prospective heirs, faster drawdowns lead to estates that are, on average, smaller. Similarly, the smaller average portfolios resulting from quicker drawdowns mean that there are reduced management and trailing fees to account managers and financial planners. Although the use of annuities can lead to smoother drawdowns, retirees have generally been quite reluctant to annuitize voluntarily (MacDonald, et al., 2011).

**Analysis:**

In the course of simulating the flows associated with drawdown strategies, Ruthen keeps track of the annual financial flows to these several parties - individuals, governments, financial managers, and heirs. Consequently, it is feasible to look at the net real flows to each of these actors, as well as the timing of these flows and the distributions that result from stochastic inflation and returns to investments, and the uncertainty about age at death. Using these flows, one can calculate the differential impacts of differing drawdown strategies on those several parties, e.g., as average real amounts aggregated over retirement.

These retirement-aggregated values will depend on a variety of factors, most of them consisting of user-supplied inputs to Ruthen. Quite non-comprehensively, they include the size and characteristics of the retirement savings portfolio entering retirement, the mortality schedule for the individual, all of the many parameters describing the tax and benefit system, the distributions for rates of inflation and returns to investments, and of course the chosen drawdown strategy. That drawdown strategy itself depends on a variety of user-specified values, including the mix of amounts drawn down via annuities or under various drawdown formulae, this independently for the registered and non-registered components of the portfolio entering retirement.

However, since this paper’s objective is illustration across several different issues, rather than a comprehensive analysis of one particular issue, it will suffice to show how the impacts vary according to the speed of the drawdown. We’ll pick a female subject, Joni Canuck, who is 0.97 times as likely to die at any age as given in the most recent Canada Life Tables. Joni has a moderate level of retirement savings, with $200,000 in registered savings, and another $100,000 in non-registered savings. She has a small $3,000 defined-benefit pension from an employer, indexed at half of inflation, and a typical Canada Pension Plan entitlement of $7,000 per year, with another $6,000 per year from Canada’s Old Age Security demogrant. Our illustration here uses a specific single-parameter drawdown method applied to both components of her portfolio. The drawdown method is the one of the more commonly described or recommended guidelines appearing in retirement planning guides. In Joni’s first year of her retirement, at age 65, she withdraws x% of each component of her portfolio, with x being the parameter under examination. Each succeeding year, she withdraws the same real (inflation-adjusted) value, continuing these withdrawals until death or the exhaustion of her savings. The retirement planning literature often recommends 4% as a safe level, and considers 5% to be aggressive. Each year Joni takes the monies from all of her income sources, including her portfolio drawdown, pays all of the associated income taxes, and spends the rest, with part of that “rest” consisting of the sales taxes payable on the her expenditures.
For our purposes, we’ll vary her first year percentage from an extremely low level of 1% to an extremely aggressive value of 10%. We’ll note that, for this simplified analysis, we have ignored a Canadian requirement that certain age-specific proportions of the value of registered savings must be withdrawn. At the higher withdrawal rates, Joni typically exhausts her savings before dying, and finishes out her life at consumption levels consistent with her small employer pension, her Old Age Security government demogrant, the Canada Pension Plan entitlement she has earned through her contributions while employed, and the income-tested Guaranteed Income Supplement payable to lower income seniors. Once she has exhausted her savings, Joni’s income level will typically be slightly above Canada’s Low Income Cut Offs, income levels that are, however incorrectly, often used as proxies for poverty lines.

Our analysis, shown in Figure 2, indicates, on an expected value basis, how Joni, her heirs, and the government sector fare, on a constant-dollar lifetime basis, as a function of the proportion withdrawn in the first year. Ruthen also derives the averages across retirement, the averages by specific year of age, and the dispersions of all of these, but that level of detail is unnecessary for this illustration. We’ve also included Joni’s discounted lifetime consumption using a 2% discount rate above and beyond inflation. That is, a level of consumption received in the future is discounted using a multiplicative factor of $1.02^{-n}$, where n is the number of years past her retirement age of 65. On average, under our personalized mortality assumptions Joni lives to a bit less than 86 years of age. However, under Ruthen’s stochastic implementation of mortality, some few of her lifetimes end at age 65, and others at 110.

![Figure 2: Sensitivity of Key Outcomes to Constant Withdrawal Rate: Sample Portfolio - $200K RRSP, $100K Non-registered, Small Pension](image)

**Discussion:**

Even recognizing that average real aggregate impacts over retirement are rather crude outcome measures, the results are interesting. The faster Joni spends down her savings, the greater her expected real total consumption over her retirement. Her probability of outliving her assets inevitably increases with the level of the initial year withdrawal, but under our assumed 4% average real rate of return on her retirement assets, even with an aggressive first-year drawdown of 6% of her portfolio, more than half of her simulated lives see her dying before her portfolio is exhausted. Although Joni’s expected lifetime consumption continues to increase with the level of the initial drawdown percentage, beyond an initial drawdown fraction of 6%, the further increments to her lifetime real consumption are relatively small.
The impacts for the government sector are also interesting. At low initial withdrawal rates, the government sector is a net beneficiary. It pays little or nothing in the way of income-tested benefits, and it collects income taxes on the withdrawals from registered savings and on the returns from non-registered savings throughout Joni’s life, and then on any remaining registered amounts and unrealized capital gains plus probate taxes at her death. As well, it collects sales taxes on Joni’s consumption throughout her retirement, and on any after-tax estate when her heirs spend their inheritances. At higher withdrawal rates, it pays out some income-tested benefits at higher ages, and receives less in the way of income taxes and probate taxes on Joni’s death. However, the government sector’s sensitivity to the withdrawal rate is low relative to the situation for Joni and her estate. We expect this because, independently of the drawdown strategy, the government always collects income tax on the registered portion of the retirement portfolio as amounts are withdrawn, or upon Joni’s death, and on the returns to all non-registered savings, and collects sales tax on all consumption, including when Joni’s heirs spend their inheritances, as well as receiving probate taxes. As Joni’s withdrawal rate increases, the expected real value of her after-tax estate naturally decreases since she is more likely to have spent the funds before dying. Not shown in this figure, the lifetime management fees received by Joni’s financial managers also decline with higher withdrawal fractions, since Joni’s funds are, on average, under management for shorter periods of time.

Overall, for the meaningful, if admittedly non-comprehensive, measures of total lifetime consumption and average consumption per year of retirement, there are strong financial incentives for Joni to draw relatively aggressively on her retirement savings.

**Gaming the System**

**The Issue**

As most retirement analysts are well aware, retirement savings held in different forms differ significantly in their abilities to support consumption in retirement. (1) In Canada, registered funds in the recently introduced Tax Free Savings Accounts, similar to Roth IRAs in the U.S., support compounding without tax penalty. Funded using after-tax contributions, they permit withdrawals that can be used directly with no implications for income-tested benefits or taxes other than paying the relevant sales taxes. (2) Savings held in non-registered forms can be drawn down without implications for income-tested benefits or income taxes, except that investment returns on these funds are taxed as they are realized. (3) However, Canadians generally hold the bulk of their retirement savings in Registered Retirement Savings Plans (RRSPs). RRSPs are generally similar to IRAs in the U.S. Generally speaking, contributors receive tax deductions for their contributions, but the funds grow without tax penalty, subject to taxation in full when the funds are withdrawn. Holders of RRSPs typically convert them to Registered Retirement Income Funds (RRIFs), which are similar to RRSPs, but require age-conditioned withdrawals, allowing the government sector to recoup the taxes it forgone when the contributor made the contributions.

For the roughly one-third of Canadian seniors who are lower-income, a challenging situation arises when they withdraw funds from their RRSPs and RRIFs. The withdrawn amounts are taxable in full as the government recoups the taxes forgone when contributions were made, usually at a combined federal and provincial tax rate of about 25%. As well, their income-tested Guaranteed Income Supplement (GIS) benefits are typically reduced by one dollar for every two dollars withdrawn. Provincial income-tested benefits and health-care premiums may increase the effective marginal tax rate further. Then, once one considers the sales taxes associated when the retiree spends the remaining fraction of the withdrawal, it may be that only about one fifth of the withdrawal translates into actual consumption.

Some analysts have argued that it may be advisable for such lower-income seniors to liquidate their RRSP holdings just before retirement, turning them into non-registered funds for which the withdrawals
will not attract the 50% benefit-reduction rates typically relevant for the GIS. They note that the marginal tax rate payable when the RRSP is liquidated will almost certainly be less than 50%, and that subsequent returns to the non-registered funds may well involve capital gains, only half of which are included in taxable income, thus reducing the effective marginal rate from income taxes and GIS benefit reductions, and from other income-tested benefit programs and health care premiums. The argument is that paying the initial costs of liquidating the RRSP fund will be compensated for by lower subsequent income taxes and smaller GIS benefit reductions, despite the loss of compounding of returns without tax penalty within RRSPs and RRIFs. To the extent that one might be able to improve retirement income by liquidating or not liquidating registered savings, that decision should be considered as part of an individual’s asset drawdown strategy. If the benefits of liquidation should prove substantial, then it would be a very important component of that strategy.

**Analysis**

It is clear that the value of any gain from liquidating the registered savings just prior to retirement will depend on the individual’s particular circumstances. Besides the specifics of the tax and transfer system, the benefits of any liquidation will depend on the tax cost of taking the funds out of the registered form, and the rate of return on the underlying investments, as well as the individual’s drawdown strategy. In this illustration we’ll look at two different costs for liquidating the registered savings, an optimistic 30% and a more realistic 40%. That is, these two values will be the assumed income tax paid when the funds are withdrawn, leaving the resulting non-registered portfolios 30% and 40% smaller respectively than the initial registered savings amount. We’ll also use mean real return rates during retirement on both the registered or non-registered funds of 3% and 5% annually. This approach results in six systems – two average real return rates for the systems, times three scenarios for the two tax costs and the non-liquidation scenario. For all of these, for consistency, we’ll use a constant real drawdown strategy that begins by withdrawing 5% of the initial portfolio in the first year, whether registered or non-registered. We’ll also hold constant the parameters for the realization of capital gains that occur within the non-registered funds.

![Figure 3: Average Real Consumption for Constant 5% Drawdown Combinations of Returns and Liquidation Costs vs No Liquidation](image-url)
Figure 3 shows the average real annual consumption in retirement associated with each of these six systems. More precisely, for values of the registered portfolio ranging from zero to half a million dollars, the figure displays six curves, corresponding to the combinations of return rate, non-liquidation condition and the two tax costs when liquidating. The differences between the “liquidate versus don’t liquidate” pairs provide one reasonable measure of the benefit or cost of the decision to liquidate.

**Discussion**

The illustrations in Figure 3 show that the form in which the assets are held makes a difference, but perhaps not as large a difference as some analysts might expect. At least for the parameters and drawdown strategy used here, keeping retirement savings in registered funds provides near optimality relative to de-registering funds held in a registered form. In a few instances, when the tax penalty for deregistering the funds is low, and the rate of return on the funds is also low, a liquidation can yield minor gains. The result that higher rates of return actually decrease the average annual real consumption values occurs because the deregistered funds are spinning off higher levels of taxable gains that, under this particular withdrawal strategy, have to be paid for at the expense of consumption. Since the fund is almost never exhausted under these higher average returns, a more rational withdrawal strategy might well call for still more aggressive withdrawals, increasing consumption and leaving fewer funds in the estate at death. As well, under the constant withdrawal strategy used in the illustration, the consumption pattern is uneven, because the tax drag on consumption in the early years depresses consumption until sufficient funds have been withdrawn so that the taxable gains decrease. That same investment income also reduces the amount of income-tested benefits received in the early years, even though one of the goals of the liquidation strategy is to reduce the impact of retirement savings on those income-tested benefits. These results suggest that, even under other assumptions, e.g., about the retention of unrealized capital gains within the fund, or the adoption of other withdrawal strategies, the liquidation of registered funds is not likely to yield more than minor improvements in lifetime consumption, and may prove counterproductive.

**How Much Difference Does Retirement Wealth Make?**

**The Issue**

The underlying premise for saving for retirement is that those savings, funded by forgone consumption during one’s working career, will permit higher consumption during one’s retirement. That is, subject to interactions with the relevant tax and benefit systems, one’s savings, along with the real growth in the invested funds, both before and after retirement, will be available for consumption during retirement. The degree of the increased consumption in retirement will necessarily depend on the level of the portfolio at retirement, i.e. the level of savings brought into retirement. It will also depend on factors such as the forms in which that portfolio is held, e.g., the mix of registered or non-registered funds, and the level of unrealized capital gains within any non-registered funds, as well as assumptions about inflation and returns on investment. As shown in the preceding section, conversions between registered and non-registered savings can make a difference. Finally, previous results suggest that it will also depend heavily on the strategy used to draw down the retirement savings. A conservative withdrawal strategy reduces the chance of running out of assets before dying, i.e., “ruin” in actuarial terminology, but significantly reduces the contribution of those assets to increased consumption in retirement, and leaves more monies “on the table” at death, to the benefit of the individual’s heirs, and the government sector.

If the purpose of saving for retirement by forgoing consumption during one’s working years is increased consumption during retirement, then one central question will be the relationship between those savings at the point of retirement, and the subsequent consumption they fund during retirement. The question is closely related to the traditional query, “Do I have enough savings to retire?” As well, from a related retirement planning perspective, a relevant question is – “For a given desired level of consumption in
retirement, what is the level of retirement portfolio necessary to fund that consumption?” To address this question, it will be useful to make a brief digression regarding the concept of a “welfare wall.”

**A Digression: The Welfare Wall**

The notion of a welfare wall was developed as a tool to look at short-term work incentives, especially for persons on welfare. It addresses the level of work and earnings needed to achieve a given level of disposable income. Figure 4 displays a totally fabricated set of welfare walls to illustrate the concept.

![Figure 4: Stylized Welfare Walls](image)

The figure shows three stylized “welfare plans” and the welfare walls associated with each of them. By tradition, the level of disposable income is the independent variable, shown on the X axis, with the level of earnings required to generate that disposable income shown on the Y axis. For one of the hypothetical welfare systems, a strict “Gross Gap Fill” program, the government guarantees a given annual level of disposable income, $18,000 for a unit with no earnings. Then, as earnings increase, the benefit is reduced at a rate of one dollar of benefit for each dollar of earnings. Since this plan does not recognize work-related expenses, as earnings increase, and the earner pays the inevitable work-related expenses and income and payroll taxes, the disposable income decreases. Only after the welfare benefit has declined to zero do increased earnings then result in higher disposable incomes. For such a system, it may be that the individual “cannot afford to work” if the work-related expenses would drive the disposable income below some minimum required level. In a second hypothetical system, a “WRE-Compensated” gap fill, the government recognizes that there are work-related expenses and taxes, and calculates the welfare benefit so that disposable income does not decrease with increased earnings. Initially, although the recipient may take pride in providing for a greater proportion of his/her own consumption, higher earnings do not bring greater disposable income. In the third hypothetical system, “Income Maintenance,” the government ensures that each increment in earnings brings at least some increase in disposable income. The traditional placement of earnings on the Y axis gives rise to the steeply sloping segments associated with low levels...
of earnings, as the welfare benefits are being reduced, and, visually, to the resulting “wall.” Individuals have to earn significant amounts before their disposable income rises appreciably.

**Analysis**

Returning to our series of Ruthen illustrations, we suggest that an analog of the welfare wall provides one tool for looking at the consumption impact attributable to one’s retirement savings. Following the welfare wall conventions, we’ll put the portfolio that Joni brings into retirement on the vertical axis, and the level of the resulting retirement consumption on the horizontal axis. From previous analyses, we already know that drawdown strategies make a great deal of difference to outcomes. Thus, we’ll use multiple strategies for the analysis. Again, since our focus is on illustrations across multiple issues rather than comprehensive analyses for a single issue, we’ll keep the strategies extremely simple. Specifically, the analysis here uses the “constant real amounts” drawdown strategy, with three different values for the proportion of the portfolio drawn down in the first year. The withdrawals in subsequent years are the constant dollar equivalent of the initial year’s withdrawal, continuing until portfolio exhaustion or death.

To make the illustration’s point more clearly, this analysis avoids the complication of any monies that may be “owing” to the government sector due to the evolution of the portfolio, e.g., from tax deferrals associated with registered savings, or unrealized capital gains. Specifically, all of these portfolios consist exclusively of non-registered savings containing no unrealized capital gains. Joni’s portfolio is thus the equivalent of her having never saved for retirement, but then receiving an inheritance on her 65th birthday, and electing to use it as her retirement fund. However, we look at several different values for that portfolio. It consists of monies that are all hers to spend as she wishes, including spending all of it in the year she retires. We’ve assumed a 4% real rate of return on monies not yet withdrawn, the bulk of it in the form of capital gains that receive preferential tax treatment. Figure 5 displays the relationships between portfolio size and Joni’s consumption in retirement for three drawdown strategies in which the first year’s withdrawal, subsequently indexed for inflation, is 2%, 4%, or 6% of the portfolio entering retirement.

![Figure 5: Retirement Wall - Non-Registered Savings Needed to Fund Given Levels of Consumption: Selected Constant Drawdown Rates, & 45 Degree Line](image-url)
Discussion
Once again, the results show just how much the total consumption in retirement depends on the drawdown strategy chosen, as well as the degree to which it varies with the size of the monies brought into retirement. The three drawdown strategies necessarily provide the same real retirement consumption when there are no retirement savings to draw down. Here, all of them support a total real consumption in retirement of about $350,000 when the level of savings brought into retirement is zero. However, for levels of savings greater than zero, the three strategies produce very different outcomes.

For an extremely conservative strategy that withdraws 2% of the portfolio’s value the first year, and then indexes that withdrawal for inflation in subsequent years, the retirement portfolio produces no incremental consumption whatsoever until it exceeds about $225,000. In essence, the taxes payable on the returns from the non-registered investment, and the income-tested benefits forgone because of Canada Pension Plan benefits and the returns to the portfolio, combine to offset the monies withdrawn, leaving Joni no better off than if she had no retirement savings. Only for still higher levels of the portfolio do the withdrawals from her retirement savings begin to fund increased consumption in retirement. Even then, Joni’s total incremental consumption pales in comparison to the size of her unencumbered portfolio. The average real after-tax value of the estate at death exceeds the funds brought into retirement.

The strategy that withdraws the “recommended” 4% of the portfolio value the first year does somewhat better. The withdrawals are sufficient to offset both the increased taxes and forgone income-tested benefits, and still fund a somewhat higher level of consumption. That said, the total increase in real consumption over the retirement period is somewhat less than half of the funds brought into retirement, and this despite the real returns Joni receives on the funds that remain unspent at any point in time. The after-tax estate is substantial.

Finally, the strategy that withdraws a very aggressive 6% of the portfolio the first year provides the greatest increase in retirement consumption over the no-savings baseline. Still, despite the growth that occurs within the portion of the portfolio remaining unspent at any point in time, the increase barely exceeds two-thirds of the funds brought into retirement. Recall that for all three of these scenarios, there were no unrealized capital gains in the non-registered retirement savings that Joni brought into her retirement.

All three of these strategies provide some increase in retirement consumption, at least if the level of savings brought into retirement is high enough. Joni may, however, be disappointed in the actual value of the increased retirement consumption she receives, especially if, in contrast to this example’s assumed source of funds, she forwent consumption during her working career to save for her retirement. None of the three strategies provides as large an increment to consumption as she would have obtained by simply spending all of the monies in her first year of retirement. Of course the distribution of consumption across retirement is likely important, but this observation gives rise to the question we examine in the next illustration, as we consider the balance between the costs and benefits of saving for retirement.

Is Saving for Retirement Worthwhile?

The Issue
Governments and financial advisers regularly lament the low levels of individuals’ retirement savings and debate ways to convince citizens to save more for their retirements. Commenting on this challenge and the associated debates, a former colleague of ours offered a concise prescription to governments: “Make it pay.” He argued, essentially, that if voluntary saving for retirement demonstrably increases people’s overall well-being, then they will probably save voluntarily. His prescription does not counsel Canadians
to refrain from saving for retirement, but reminds governments that if they implement tax and benefit systems that place unreasonable costs or impose disincentives on those who save, then those savers may save less or cease to save. Measuring the balance between the accumulation period’s consumption losses incurred by saving, and the ensuing consumption gains in retirement, is this section’s focus.

The Ruthen results to this point have addressed only the retirement-drawdown component of the larger retirement savings issue. This focus reflects our efforts, for the first version of Ruthen, to create a tool to help individuals choose drawdown strategies that make the best use, best according to their individual standards, of their savings at retirement. More generally, however, the individual first forgoes consumption during the accumulation phase in order to save to fund increased consumption during retirement. Details will vary according to the strategy employed for saving and the one employed for drawdown, and the tax/transfer system, as well as a variety of stochastic elements associated with returns to the portfolio. Inevitably, however, to address the broader issue of the value of saving, one must address both the accumulation and decumulation phases.

Toward this objective, in this section we use a very simple model of the accumulation phase, calculating the real consumption forgone each year to accumulate retirement savings. We then merge the forgone real consumption series with its counterpart series in retirement, i.e., for increased real consumption resulting from the drawdown of those accumulated assets. We thus obtain a lifetime series for the impacts of saving and then spending the results of the savings. This lifetime series reflects the average differential real consumption for retirement savings, and retirement consumption, measured relative to a baseline of not saving for retirement. In this, it mirrors one component of the Canadian government’s Seniors Segment Service Strategy, showing the net consequences, before and after retirement, of not saving for retirement. For purposes of this illustration, we shall use a crude but generally reasonable summary measure of the lifetime consequence of the saving and drawdown, specifically, the internal rate of return for that merged series. Broadly speaking, as used here, this internal rate of return (IRR) is the real “interest rate” that exactly balances the expected lost real consumption associated with saving for retirement against the expected real incremental consumption that those retirement savings yield during retirement. The higher the IRR, the more effective the savings have been in fostering increased consumption in retirement. From a more comprehensive perspective than we are able to develop in this paper, ascertaining whether saving for retirement is worthwhile would involve a complex set of considerations. These would range from the purely financial, through the social, the personal, e.g., in the sense of not depending too much on others, to, for some, the spiritual. However, given our limited objectives in this paper, we shall use only variants of the simple, quantifiable, real internal rate of return for a lifetime series of real consumption amounts derived as differences between saving and not saving.

**Analysis**

The preceding sections have already illustrated Ruthen’s simulation of the drawdown phase, so this subsection will address only the accumulation of the assets to be carried into retirement. Our approach provides only a crude approximation of the asset accumulation phase, ignoring a wide variety of very real issues such as career path and earnings variability, disability, periods of unemployment, and involuntary retirement, to name a few. Nonetheless, our characterization is more sophisticated than most of the accumulation formulations found in the literature on saving for retirement. We consider it to be minimally adequate for purposes of this paper’s analyses, given their limited objective of providing some useful illustrations of system incentives with respect to key retirement issues.

Our approach is that of “following the money” for a relatively simple deterministic accumulation plan. The subject starts to save at a given age. For our purposes, we chose age 30, when education debts, and the initial costs of starting a family, might well be paid off. The saver puts a given number of dollars into registered savings, and another amount in non-registered savings, e.g., as is typically recommended for an
emergency fund. Each year, the funds grow at a given real rate of return. We assume that the subject’s real earnings grow at a given rate, 1% for our purposes, and that her real annual (new) savings, registered and non-registered, grow at this same rate. This leaves the ratio of savings to earnings a constant over the accumulation period. The registered savings grow without tax penalty, with the individual spending any tax refund associated with those registered savings. Non-registered savings are a bit more complicated because, even during the accumulation period, they spin off returns that are taxable. Perhaps somewhat simplistically, we use the same assumptions about the mix of returns and the realization of capital gains as we use for the retirement phase. Taxes owing on the returns are paid out of what would otherwise have been disposable income in the absence of such taxes. Generally speaking, the growing tax burden from these returns over the accumulation period is somewhat offset by the growing real earnings, so that the trends in consumption during the accumulation phase remain relatively smooth. The question of “how flat?” depends heavily on the various parameters used. Disposable income after income taxes generates the accumulation phase consumption and the associated sales taxes. The differences between the “with savings and without savings” consumption streams, calculated using an assumed constant marginal tax rate, generate, after certain adjustments we describe below, the accumulation phase portion of the lifetime series we require. Because we keep track of the differences in income taxes and sales taxes, we can later also look at the impacts of the individual’s saving on the government sector.

The required adjustments are those relating to mortality. Although the probabilities of dying during the accumulation phase are relatively low, they are not zero. Thus, for the individual, the differences at any given age have to be multiplied by the probability of surviving to that age. Corresponding mortality-related adjustments are required to generate the series of impacts for the government sector. These include multiplication by the probability of surviving to each age, but also involve calculating the taxes payable upon the death of the individual, those from the taxation of any unrealized capital gains in the non-registered portfolio and the taxation of all funds in the registered portfolio, as well as the probate taxes payable on the total portfolio, all of them adjusted for the probabilities of death at each given age. For consistency, we also include in the differential government revenues the sales taxes that the individual’s heirs will pay when they spend the post-probate assets obtained from the retirement savings remaining at death. Fortunately, parameter-driven spreadsheets make all of these calculations eminently feasible.

At the end of the accumulation period, at age 65, the accumulated registered and non-registered savings provide the funds that the individual carries into retirement. We can thus meld the accumulation phase series of differential consumption, with and without saving, with the corresponding expected differential consumption series after retirement, taking care to ensure that the mortality, inflation, and any discounting factors are synchronized across the two sub-series. Given the strong dependence of results on one’s assumptions and parameters, we calculate the internal rates of return for several scenarios, using an illustrative mix of parameters for the savings and several drawdown strategies.

In an analysis limited to only a few pages, one can scarcely be comprehensive. Nonetheless, we want to give some rough idea of the spectrum of possibilities one might consider. To do so, we shall present results for 20 different variants of Joni. We use –

1. Two different levels of portfolios as the time of retirement: “$300,000,” indicating that the portfolio is $300,000 at retirement, consisting of $200,000 in registered savings and $100,000 in non-registered savings, 12% of it as unrealized capital gains, or “$600,000,” indicating that the portfolio is $600,000 at retirement, with $400,000 in registered savings and $200,000 in non-registered savings, 12% of it as unrealized capital gains.
2. Two different levels for the real rate of return, assumed to apply over both the accumulation and decumulation periods: “3%,” indicating that the real rate of return, above inflation is 3%, and “5%,” indicating that it is a fairly optimistic 5%.
3. Five drawdown methods, each of them applying to both the registered and non-registered components: (1 & 2) “Constant Real, 4%” and “Constant Real, 5%,” indicating that the funds are
drawn down in constant real amounts based on initial year draws of 4% and 5% of the portfolio values at retirement, (3) “Full Annuitization,” indicating that the registered and non-registered portfolios are annuitized (using proceeds consistent with currently advertised annuities), and (4 & 5) “Equal Instalments to Age 77” and “Equal Instalments to Age 90,” indicating that the portfolios are drawn down in roughly equal real amounts that exhaust the portfolios at age 77 and age 90 respectively. The lower age, 77, reflects the approximate end of Joni’s expected period of disability-free living, while the higher age, 90, is a little more than 5 years beyond than Joni’s expected age at death under the most recent standard Canada Life Tables, if she’s lived to 65.

Our 20 variants stem from the possible combinations of our differing parameter values: two retirement portfolio levels, times two real return rates, times five drawdown strategies. We hold a variety of other important parameters and assumptions constant across these 20 variants. These include using unadjusted Canada Life Table values for mortality, Canadian and Ontario 2009 values for the tax and benefit system, and 2.5% as the mean value for annual inflation. Table 1 shows the real internal rates of return flowing from this set of parameters and assumptions.

Table 1: Individual’s Internal Rates of Return for Saving for Retirement (%): By Amount Saved, Real Return on Underlying Investment, and Drawdown Strategy

<table>
<thead>
<tr>
<th></th>
<th>Constant Real 4% Initial</th>
<th>Constant Real 5% Initial</th>
<th>Full Annuitization</th>
<th>Equal Instalments to Age 77</th>
<th>Equal Instalments to Age 90</th>
</tr>
</thead>
<tbody>
<tr>
<td>$300,000, 3% Return</td>
<td>-0.549</td>
<td>0.584</td>
<td>1.778</td>
<td>1.902</td>
<td>0.972</td>
</tr>
<tr>
<td>$300,000, 5% Return</td>
<td>0.467</td>
<td>1.801</td>
<td>2.263</td>
<td>3.833</td>
<td>3.154</td>
</tr>
<tr>
<td>$600,000, 3% Return</td>
<td>0.378</td>
<td>1.240</td>
<td>1.551</td>
<td>2.059</td>
<td>1.524</td>
</tr>
<tr>
<td>$600,000, 5% Return</td>
<td>1.422</td>
<td>2.431</td>
<td>2.843</td>
<td>3.933</td>
<td>3.494</td>
</tr>
</tbody>
</table>

Discussion of the Real Internal Rates of Return

Table 1 provides a variety of interesting results, but in keeping with this paper’s objectives we shall discuss only a few highlights. (1) The average rate of return on the underlying investments makes a difference. Comparisons between the corresponding elements in rows 1 and 2, and rows 3 and 4, show that the individual’s internal rates of return are higher when the average return on the investments is higher. (2) The internal rates of return are lower than the return on the underlying investments, sometimes substantially so. We expect this, because (a) some of the savings remain unspent at death for drawdown strategies other than annuities, and because (b) the savings and returns to them serve to reduce the levels of income-tested benefits received. (3) The internal rates of return are higher for the higher levels of savings. Again, we expect this because, relative to the situation for lower levels of savings, the savings drawdowns and returns to savings for higher savings levels cannot further reduce income-tested benefits once those benefits have been reduced to zero. (4) The internal rates of return are substantially higher for the more aggressive drawdown strategies that leave the individual more likely to exhaust the portfolio before death, e. g., C5 versus C4, and N77 versus N90. Given the results reported in previous sections, this too is expected. In the more aggressive drawdown strategies, the savings are used more efficiently in the sense that, on average, fewer of them remain unspent at death. (5) Annuities, at least as modeled here, perform respectably, though not optimally, on the internal rate of return measure we’ve used. They achieve this as the result of their design, which statistically moves monies that might otherwise be left
unspent at death into the period in which the individual is still living, eliminating those monies from the individual’s estate.

**Discounting the Real Consumption Impacts of Saving**

Measures of the consumption-based real internal rates of return on retirement savings are a meaningful, if crude, starting point, but they fail to incorporate the time value of that consumption. Economists and psychologists note that, even after adjustments for inflation and mortality, most individuals prefer consumption sooner rather than later. Such preferences recall the maxim “A bird in the hand is worth two in the bush.” For example, retirees may prefer to travel while they have the physical mobility to explore the visited locales more effectively, and have more years afterward to recall the experience. They may prefer to play tennis or golf while their bodies are still capable of playing effectively. Or they may prefer to enjoy fine cuisine while their palettes will still appreciate the flavours, or their digestions still tolerate the foods. They might prefer to attend concerts before they lose the capacity to hear certain frequencies, or before their favourite performers retire or die.

Perhaps for mathematical convenience, the most common form of discounting is exponential, the form we used for one of the curves in Figure 2. Relative to year 0, an increased or decreased consumption in year \( t \) is weighted by \((1+x)^{-t}\), where \( x \) is the personal discount rate, e.g., 0.02. Thus, the further into the future a benefit or cost occurs, and the higher the personal discount rate, the lower its weight. Because the costs of saving occur before the benefits of increased consumption in retirement, calculating an internal rate of return for a discounted series will lead to a lower IRR. Quantitatively, an individual’s personal discount rate is a matter of individual preference, but a value of 2% is not considered unreasonable. For a personal discount rate of 2%, we would expect the internal rate of return for the discounted series to be about 2% lower.

One may also consider a personal discount rate to be broadly analogous to an investment technique used by some corporations to decide what prospective projects to undertake. They calculate a projected internal rate of return for a project, based on the expected series of costs and profits; they may then elect to undertake the project only if its rate of return exceeds some specified minimum corporate rate. They might, for example, decline to undertake any project that did not promise an internal rate of return of at least 6%. If such a principle were to be applied here, an individual might elect to save only if the expected real internal rate of return exceeded his/her personal discount rate. Thus, by analogy, an individual with a 2% discount rate might elect to undertake the “project” of saving only if the anticipated real internal rate of return for that saving exceeds 2%.

Across our set of scenarios, for a discount rate of 2%, more than half of the discounted IRRs would correspond to a negative discounted real internal rate of return. The exceptions tend to be situations where the rate of return on investments is fairly high, or the individual can accumulate a substantial amount (here, more than ten times the real average annual gross earnings from full-time employment), or the drawdown strategy is aggressive, with a significant chance of the individual outliving the savings. We summarize these results as Morrison’s First Law: “Saving for retirement can be an effective means of reducing your discounted real lifetime consumption.” This maxim does not deny that there may be other benefits associated with saving for retirement, e.g., consumption smoothing, or the satisfaction of greater self-sufficiency. Rather, it points out that such benefits may come with significant financial costs to the individual if the tax and transfer system effectively appropriates most, all, or even more than all, of the financial returns to saving. Phrased differently, the illustrations might suggest why some individuals might not be inclined to save for retirement, e.g., because they do not expect to achieve a sufficiently high effective real rate of return on their investments, perhaps because they do not expect to be able to amass sufficient savings to make the consumption increments worthwhile, or because they feel obliged to follow conservative prescriptions about how quickly to draw down their savings. Some Canadian analysts have
suggested that, consistent with these illustrative results, individuals who expect to be receiving income-tested GIS benefits in retirement should probably not bother to save for retirement.

**Retirement Saving: Cui Bono?**

**The Issue**

The preceding analyses suggest that, at least for the crude internal rate of return measures we report here, saving for retirement may not be particularly advantageous for some individuals, particularly if they place much of a time (discount) value on their real consumption. Thus, it is useful to look at another side of the issue, the impacts on the government sector of individuals’ decisions about saving, and the question of the extent to which the government sector may benefit from the individual’s voluntarily saving for retirement.

**Analysis**

Our approach in this illustration will be the same “follow the money” approach that we used for individuals. Always accounting for probabilities associated with mortality, we looked at the time series reflecting the consumption forgone by savers during the accumulation phase and the expected age-specific incremental consumption during retirement flowing from drawing down those same savings.

We argue that the “loss during savings, gain during drawdown” principle applies equivalently to the government sector. When the individual saves, the government sector generally forgoes revenues. It does not collect sales taxes on the monies saved rather than spent, and for some forms of registered savings it may collect fewer income taxes by allowing deductions for the amounts saved. Then, when the individual retires and draws down the savings, the government sector generally benefits, e.g., through paying out lower income-tested benefits, through higher income taxes on withdrawals of registered funds and the realization of previously unrealized capital gains from non-registered savings, and from sales taxes when the individual spends the remaining portion of the withdrawals. There will also be probate and income taxes from any portfolios remaining at death, and sales taxes from the heirs when they spend their inheritances. Although the individual controls the levels and timing of the voluntary saving and the withdrawals, the government generally loses revenues when the individual saves for retirement, and gains them when the individual draws down those savings in retirement.

This complementarity implies that, just as we can derive internal rates of return for the individuals based on the consumption impacts of their savings and drawdown behaviour, we can generate the corresponding internal rates of return for the government sector on that same savings/drawdown behaviour. However, unlike the individuals, the government sector never “leaves money on the table” in that, as seen, it taxes unused registered savings and realizes any unrealized capital gains at death, as well as charging probate taxes and receiving sales taxes on inheritances when the heirs spend them. Using this general approach, Morrison (2008) addresses internal rates of return on the involuntary system of Canada Pension Plan contributions and benefits. That analysis shows that, by gender, and for all cohorts of the Canada Pension Plan’s contributor/beneficiary participants, the government sector’s projected after-tax internal rate of return on the CPP is substantially higher than that for the CPP participants themselves. The analysis here addresses the analogous question of whether the government-advantaged results observed for Canada’s mandatory government pension plan also emerge for individuals in respect of their voluntary retirement savings.

Table 2 shows the government sector IRRs for the same set of scenarios of parameters and drawdown methods used to look at individuals’ effective real lifetime rates of return on voluntary retirement saving.
Table 2: Government Sector’s Internal Rates of Return for Individuals’ Voluntary Saving for Retirement (%):
By Amount Saved, Real Return on Underlying Investment, and Drawdown Strategy

<table>
<thead>
<tr>
<th>Amount Saved</th>
<th>Constant Real 4% Initial</th>
<th>Constant Real 5% Initial</th>
<th>Full Annuitization</th>
<th>Equal Instalments to Age 77</th>
<th>Equal Instalments to Age 90</th>
</tr>
</thead>
<tbody>
<tr>
<td>$300,000, 3% Return</td>
<td>3.385</td>
<td>3.528</td>
<td>4.073</td>
<td>3.394</td>
<td>3.582</td>
</tr>
<tr>
<td>$300,000, 5% Return</td>
<td>5.211</td>
<td>5.411</td>
<td>5.434</td>
<td>5.616</td>
<td>5.672</td>
</tr>
<tr>
<td>$600,000, 3% Return</td>
<td>2.476</td>
<td>2.787</td>
<td>3.028</td>
<td>3.162</td>
<td>2.912</td>
</tr>
<tr>
<td>$600,000, 5% Return</td>
<td>4.494</td>
<td>4.798</td>
<td>4.832</td>
<td>5.474</td>
<td>5.254</td>
</tr>
</tbody>
</table>

Discussion of Government Sector Real Internal Rates of Return

The results are simple to summarize. The government sector’s real internal rate of return on the individual’s voluntary retirement savings is consistently higher than the individual’s internal rate of return on those same savings, often substantially so. For many of the scenarios the government sector’s real internal rate of return exceeds the real rate of return on the individual’s underlying investment. The government sector achieves these elevated real rates of return almost independently of the individual’s method of drawing down his/her retirement savings.

We summarize this set of results with Morrison’s Second Law: “The government sector’s real internal rate of return on your retirement savings is higher than yours.” The causes of this result lie with the design of the tax and transfer system. They range from the necessity to income-test the benefits provided to lower-income seniors, to the progressivity of the income tax system, particularly when seniors die early with large amounts of registered savings, to lesser contributors such as probate taxes. Nonetheless, taken together, they guarantee that those governments that can convince citizens to save for their retirements, and to achieve healthy rates of return on those savings, will do very well out of those citizens’ savings.

Potential Policy Relevance

As noted, this paper’s focus lies with analyses that illustrate some of the incentives relevant for retirement savings and their drawdown during retirement. Our illustrations are precisely that, illustrations. They may identify potential problems with respect to incentives, but all of them would require considerably more work to be compelling. Therefore, this paper should not, and does not, adopt a major policy focus. Nonetheless, should these findings and concerns prove to be well-founded, there are relatively straightforward ways of addressing them. Governments could, if they wished, take actions to improve incentives to save. In our colleague’s words, they could “Make it pay.” They might elect to reduce the apparent mismatch between individual and government rates of return on individuals’ voluntary saving. For example, they could accomplish this by something as simple as counting only a fraction of portfolio drawdowns in retirement for purposes of tax and benefit calculations. Such an approach would be broadly comparable to the current treatment of capital gains in the sense of including only a fraction of them in the income measures used for tax and benefit purposes to encourage taxpayers to accept longer-term risks that benefit the country. In the absence of any behavioural effects, a policy of counting only a fraction of withdrawals would reduce tax revenues and increase the costs of income-tested benefits. However, if this
treatment, or another with similar effects on incentives, increased voluntary savings significantly, then the aggregate impact on government finances might well be neutral, or even fall in the direction of improved government finances. Analyses such as those presented in this paper could allow governments to better measure the improvements in citizens’ incentives to save. Perhaps more importantly, they would allow those same governments to communicate the improvements to the citizens whom they want to save more, or to draw down their retirement assets differently.

Conclusions

The illustrations in this paper demonstrate that, using personal longitudinal microsimulation models, it is feasible to address quantitatively the question of individuals’ incentives with respect to saving for retirement and drawing down the resulting assets during retirement. We believe that the derived incentives, even if the various methods and assumptions need to be tuned and generalized, provide some useful insights into the retirement savings and retirement spending decisions that individuals make. We think our results offer some insights into individuals’ decisions, including some that may frustrate governments and financial planners. More specifically, these illustrations raise the possibility that, under “not unreasonable” assumptions, individuals may actually know what they’re doing when they pursue “undesirable” behaviours on retirement saving and spending. The illustrations suggest that, perhaps, traditional advice saving for retirement and spending in retirement may significantly decrease some individual’s discounted real lifetime consumption in the course of smoothing that consumption. They suggest that traditional rules of thumb may disproportionately advantage governments, heirs, and financial managers rather than the advisees, i.e., the savers themselves.

We have noted that one can calculate the government sector’s rates of return on individuals’ voluntary savings, and that the government rates appear to be much higher than those for the individuals themselves. Should this finding be confirmed, it could allow governments to tune the parameters of the tax and benefit system for retirement saving and drawdown so that individuals have greater incentives to save, and to alter the way they spend assets during retirement. The illustrations raise at least the possibility that individuals’ behavioural responses to improved incentives could actually strengthen the financial picture for governments at the same time that it advances the financial security of its citizens.

In presenting these results we have been adamant that they are, at this stage, only illustrations. Yet, in view of the importance of the issues addressed, we think that the direction and strength of the several results mean that governments should probably undertake a more comprehensive study of these issues, and of the incentives for individuals’ saving and spending.

The version of Ruthen we use for our illustrations here is clearly inadequate to that broader task. We shall mention here only a few of the more important considerations that we think ought to be part of any more comprehensive study. Those analyses should adopt a more sophisticated model of the accumulation phase, including earnings trends and variability, unemployment and disability, and the timing of retirement. They must be able to treat the timing of the savings, this in the context of other priorities such as paying off education debt, starting families, and buying homes. More sophisticated analyses must be able to handle couples and families, rather than just individuals. Consequently, they should be able to address issues such as economies of scale for households of various sizes, as well as significant life events such as divorce and widowhood, and their impacts on the affected individuals, both before and after retirement. Further, those more comprehensive analyses should allow for more sophisticated strategies and financial instruments, for loans and ongoing expenses, and must permit conditional responses to various financial, economic, and social events. They should allow actors to have and optimize more flexible objective functions than the simple ones used in these illustrations, explicitly addressing the fluctuation of consumption during the accumulation and drawdown phases, and potentially assigning
some positive recognition to any funds left to heirs. Finally, of course, the modeled tax/transfer system should be much more general. It should apply to provinces other than Ontario, and countries other than Canada. Fortunately, from our perspective, since Ruthen is primarily a model for informing private clients, these requirements for better government-relevant analyses are the same ones we think are required to allow individuals and couples to make better decisions for themselves. We are currently developing the next version of Ruthen to better address all of them.

References


Côté, Jean-Daniel. “Is Canada ready for the DC spend-down phase?” Benefits Canada (newsletter) November 26, 2010
