PWL

Getting more without saving more

Graham Westmacott MBA, CFA
Portfolio Manager

PWL Capital Inc.
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This report was written by Graham Westmacott, PWL Capital Inc. The ideas, opinions, and recommendations contained in this document are those of the authors and do not necessarily represent the views of PWL Capital Inc.

Graham Westmacott, *Portfolio Manager*, PWL Capital Inc.,"Getting more without saving more"

For more information about this or other publications from PWL Capital, contact:

PWL Capital – Marsland Centre, 20 Erb St. W, Suite 506, Waterloo, ON N2L 1T2
Tel 519-880-0888 • 1-800-230-5544 Fax 613-237-5949
waterloo@pwlcapital.com

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1 Introduction

In planning how to fund your retirement, you might think about dividing your savings in the same way as you would a pizza. If you believe your retirement will last 30 years, you could divide your savings into 30 slices, one for each year of retirement. However, a typical portfolio will generate 40-60% of the income from investment returns during the retirement period, so the amount and timing of withdrawals can have a big impact on your total income. Add in other complications, such as government benefits and pensions, inflation, taxes and uncertain longevity, then planning decumulation (generating an income from your savings) begins to take on what Nobel prize winning economist Bill Sharpe described as "the nastiest, hardest problem in finance."[1]

Fred Vettese, former chief actuary at Morneau Shepell, has written extensively on the challenge of decumulation for Canadians. His most recent book, Retirement Income for Life, subtitled Getting More Without Saving More (which we borrowed for the title of this paper) considers ways to use assets gathered for retirement to generate a lifetime income.

Inspired by Vettese, we seek to quantify in this paper the impact of three of his income-enhancing suggestions:

- deferring the Canada Pension Plan (CPP) pension
- relaxing the requirement that withdrawals be indexed to inflation
- allowing for variable withdrawals from savings

Of these three suggestions, our research confirms Vettese's observation that, in most cases, variable withdrawals make the most important contribution to income enhancement.

Before exploring the impact of these income-enhancing approaches, we should discuss our criteria for success. To be clear, how much you need for retirement, and how it should be accumulated, do not concern us here. We assume an accumulated amount of savings and look at how this pool of money can be most reliably converted into a lifetime of retirement income.

Specifically, we want to maximize sustainable spending throughout retirement. If one planning scenario yields a median expenditure[2] of $80,000 per year, and the another a median of $90,000 per year, then the second scenario is preferred. This might seem obvious, but a higher income also introduces a higher risk of prematurely running out of money.

To ensure a consistent comparison between outcomes, we also have to specify the likelihood of success, or confidence level. For financial planning, 90% is a commonly accepted level of confidence, and we will follow this convention. A 90% confidence level in achieving an annual income of at least $80,000 means there is a 10% chance that the income will be below $80,000.

[1] https://www.bloomberg.com/opinion/articles/2017-06-05/tackling-the-nastiest-hardest-problem-in-finance

[2] We will use expenditure to refer to the amount left after taxes have been paid on government benefits, pensions, and withdrawals from investments.

2 Deferring the CPP pension

The CPP pension may be started at any age between age 60 and 70, although the normal start date is 65. Deferring the CPP pension from 65 to 70 increases the payout by at least 42%, an effective annual risk-free return of 8%.

The argument over whether it is a good thing to defer taking the CPP often focuses on when the retiree will die. If the retiree has an exceptionally long life, then the higher payout more than compensates for the lost income from deferral. In most cases, a single person who lives beyond age 76 would be better off deferring their CPP pension beyond age 65.[3] Financial planning standards recommend assuming retirees live to age 95, so any financial plan using this assumption will show a preference for delaying CPP.

Deferring the CPP pension means that more income is guaranteed and inflation indexed later in retirement. Since the CPP continues while the retiree is still alive, deferring CPP also reduces the risk of outliving your money. The trade-off is withdrawing more heavily from personal investments early in retirement while you wait to collect your CPP.

As Vettese explores in his book, there are objections to deferring the CPP pension. With fewer than 1% of retirees choosing to defer the CPP pension, there are clearly powerful disincentives at work.[4] For many retirees, deferring CPP is not an option if they have minimal retirement savings.

It is also possible to delay OAS, but the impact is less than delaying the CPP pension and we do not consider this option.

3 Spending patterns in retirement

A common assumption is that retirees will maintain a constant level of expenditure throughout their retirement. This makes sense for essentials such as maintaining a home, and food. However, studies throughout the developed world have shown that overall expenditures decline with age. This is consistent with the anecdotal observation that travel and social interaction declines with age due to declining health and mobility.

Vettese cites several studies from developed countries that indicate expenditure falls by 1 to 2% per year for retirees, starting in their late 60s. Currently, expected inflation is 1.7%, so relaxing the requirement for inflation indexing brings expenditure in line with the experience of most retirees. Other more, or less, severe declines in spending could be equally be assessed.

[3] https://www.advisor.ca/tax/tax-news/deciphering-the-cpp-crossover/

[2] Unless your advisor acts as a fiduciary, they might be inclined to advise taking CPP early to preserve your investments and their fees. Some advisors might show a lack of interest in the whole topic of decumulation for similar reasons.

4 Variable spending

How much you can spend today depends on how much you have today and how much you want to spend tomorrow. Intuitively, this makes more sense when thinking about withdrawing money from retirement savings than the well-known 4% rule. The rule holds that 4% of an initial portfolio is withdrawn every year, regardless of the value of the portfolio. Not surprisingly, constant withdrawal rules, like the 4% rule, can lead to running out of money prematurely, or leaving an unintentionally large bequest.

The withdrawal rule we will use is known as the annually recalculated virtual annuity (ARVA). It reflects the actual investment experience of retirees and can be summarized as follows:

> *"Each year, an amount that can be safely withdrawn from the portfolio is calculated by assuming that the retiree has purchased with their investments an annuity that provides an annual income for the remainder of their retirement"*

At its simplest, the ARVA rule splits a lump sum into equal parts, depending on the number years of retirement remaining. For example, spending $10,000 over 10 years would result in a payout of $1,000 every year. More realistically, if the real[5] discount rate were, for example, 2%, the amount set aside now to yield $1,000 in 10 years would be only $820. The lump sum required to pay out $1,000 every year for 10 years would be $9,170. This is an annuity calculation, hence ARVA's name. Using ARVA doesn't require buying an annuity but does require annuity thinking. When applied to investments that have uncertain future returns, the annual withdrawal varies depending on the size of the portfolio in any given year.

We extend the ARVA to non-uniform payouts so we can accommodate the impact of CPP and any other pension sources on the withdrawal required from investments to meet income needs. This is explained in more detail in Appendix A. Here we illustrate the impact of CPP deferral, the removal of inflation indexing, and variable spending with the fictitious case study of Alice and Bob.

5 Alice and Bob unplugged

Alice and Bob are the same age and both retired at 65. Together, they have $2 million split equally between their RRSPs. They are both entitled to full CPP and OAS and both expect to live to 95. They have no other sources of income.

Alice and Bob's investments are 60% in stocks and 40% in bonds.[6]

We used Naviplan, a well-known financial planning tool, to compute the maximum after tax expenditure that Alice and Bob can sustain for the 30 years of their retirement. We require that Alice and Bob's have only a 10% chance of running out of money.

[5] "Real discount rate" refers to an interest rate stripped of the impact of inflation: real rate + inflation rate = nominal rate.

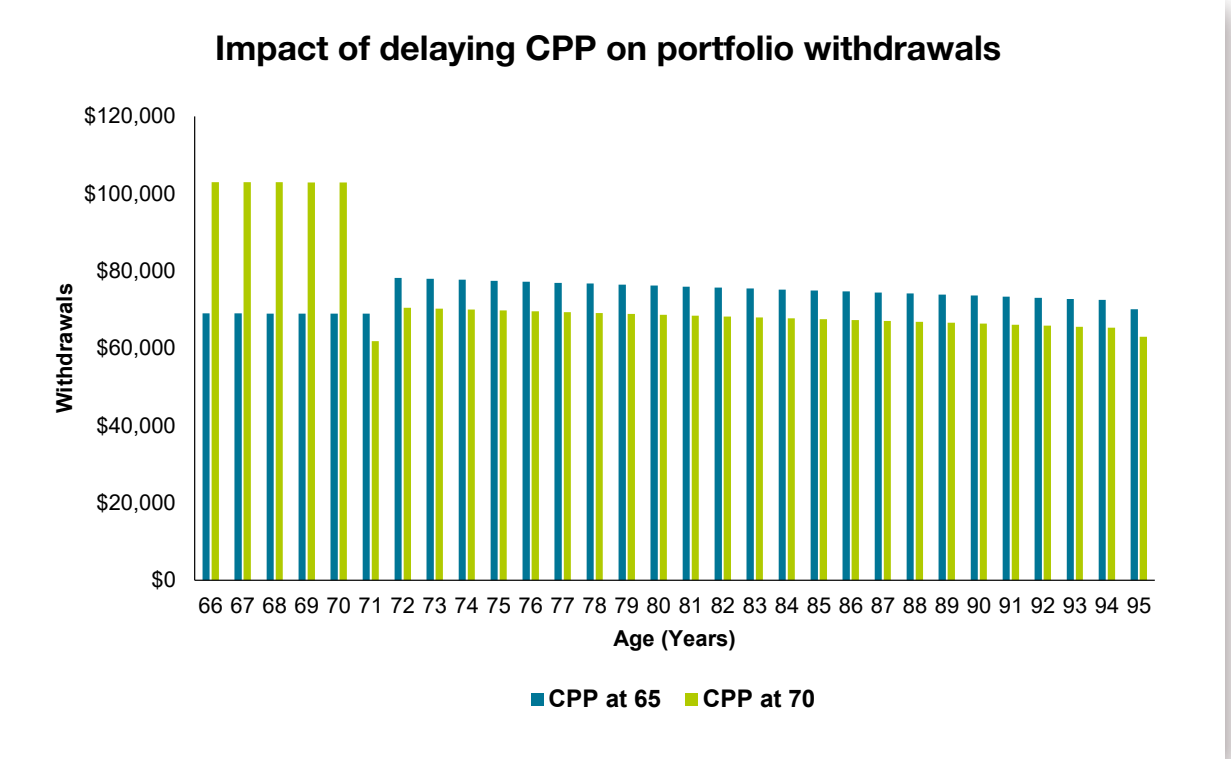
[6] We use our model portfolio of 40% FTSE TMX Universe Bond Index, 20% S&P/TSX 60, 20% IA SBBI US Large Stock, 20% MSCI EAFE index. Total fees, including tax, 1.4%. Expected return 5.23%, volatility 6.83%.

If Alice and Bob take their CPP pension at age 65, they can spend $93,000 after tax annually throughout retirement. If they delay their CPP pension to 70, this rises to $97,200, an increase of 4.5%. Not drawing the CPP pension at age 65 means that more money has to be drawn from the RRSPs from age 66 to age 70. The average return on the investments in the RRSP is less than the implied return from delaying their CPP pension, so the net effect is a higher total income.

We can see the impact of delaying the CPP pension on Alice and Bob's investments in Figure 1 below. We show the median withdrawal for taking CPP pension at 65 and delaying to 70. In both cases, the withdrawal increases after age 71 because the RRSPs are converted to RRIFs and subject to minimum RRIF withdrawals, resulting in higher taxes.

We used a statistical method (Monte Carlo simulations) that selects portfolio returns assuming they are distributed randomly about a mean value. We then computed the median value from 500 independent simulations. In the results that follow, all calculations are in real dollars (i.e. today's dollars). A constant withdrawal means that purchasing power is preserved.

Figure 1



Source: PWL Capital

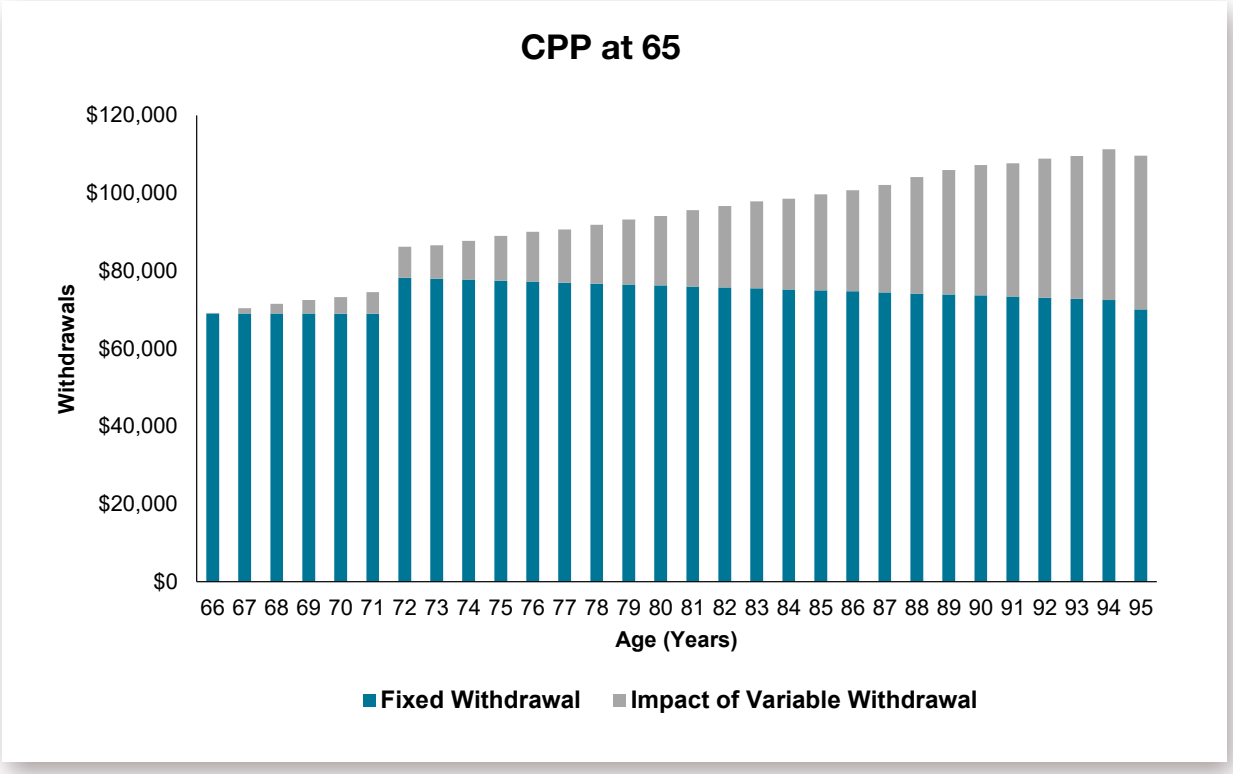
Figure 1 shows only the amount withdrawn from the portfolio. Alice and Bob's total after-tax expenditure is the portfolio withdrawal plus their CPP and OAS, less taxes paid.

If Alice and Bob take their CPP pension at 65, and withdraw the amount indicated by the blue bars every year, then they will have an annual after-tax income of $93,000 until 95, with 90% confidence. However, ensuring they have some money left in 90% of cases means that, on average, they will leave rather a lot of money behind when they die.

An analogy is fuelling an aircraft for a long trip. Depending on headwinds, altitude and other factors, the amount of fuel consumed will vary. If you want to make sure you have enough to get you there in at least 90% of cases, then in average conditions, there will be a significant amount of fuel left in the tank when you land.

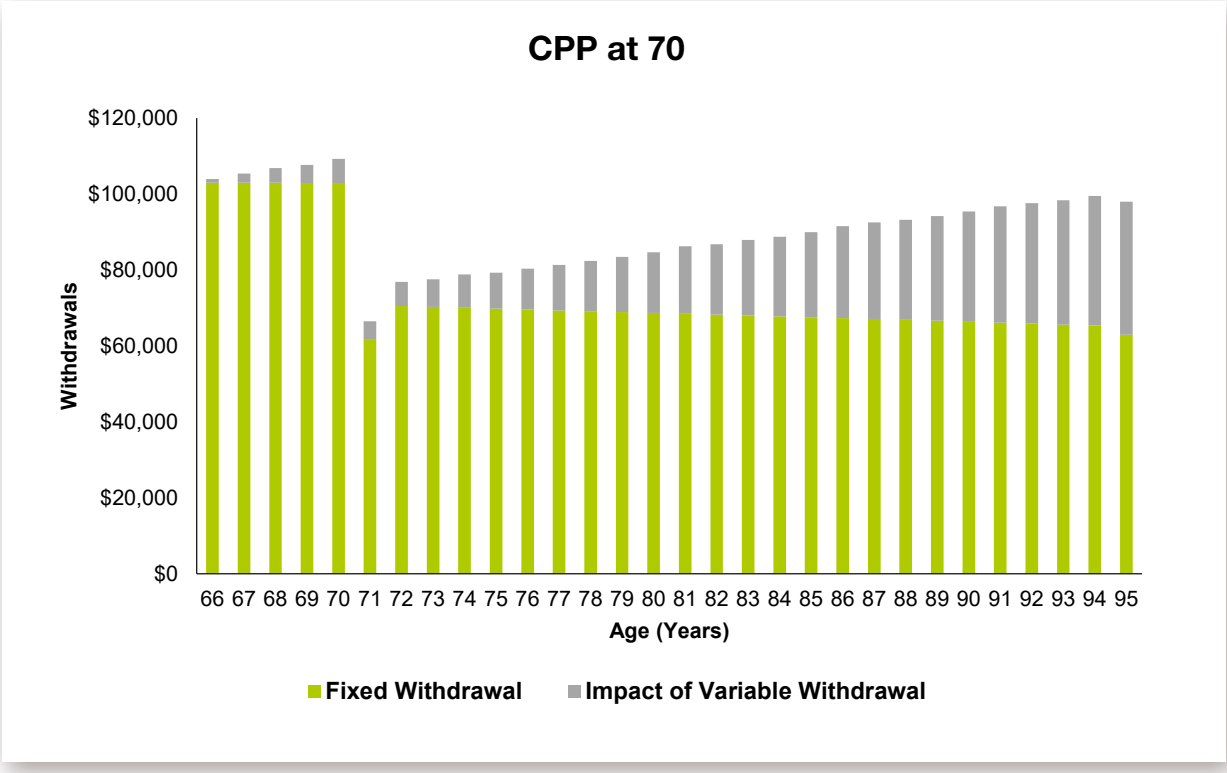
This is where the ARVA scheme can be used to give Alice and Bob the opportunity to adjust their withdrawals—spending more when markets are doing well and trimming expenditures when markets are poor. Figure 2a shows the impact of ARVA when the CPP pension is started at 65 and Figure 2b shows the impact when the CPP pension is delayed to 70.

Figure 2a



Source: PWL Capital

Figure 2b



Source: PWL Capital

The grey bars in each figure represent the additional sustainable withdrawal from using ARVA. With the CPP pension at 65, the total increase in withdrawals from using ARVA is $577,000 during retirement. By delaying the CPP pension until 70, Alice and Bob's withdrawals increase by a total of $518,000. This is a percentage increase in the total withdrawal of 26% (CPP at 65) and 24% (CPP at 70), although most of the gain is in the latter part of retirement.

Recall that the gain from delaying the CPP pension to 70 is 42%, or $4,200 per year after tax. This equates to $126,000 over the retirement period. If we assume a marginal tax rate of 30% in retirement, then Alice and Bob would gain $404,9000 (577,000 x 0.7), after tax, from using ARVA and taking CPP at 65. If Alice and Bob delayed the CPP pension to age 70, they would gain $489,000 ($126,000 + 0.7 x $518,000) by using ARVA.

How variable is Alice and Bob's annual income under ARVA? Most retirees prefer a steady income stream but might be willing to see small fluctuations year to year in exchange for a higher average income. To assess the degree of variability using ARVA, we calculated the average variation from age 72 to age 91 when the average change in withdrawal is small and linear.[7] The results are similar whenever CPP is taken, so we limit our attention to the case when CPP is taken at 65.

[7] We de-trend the data to remove any linear variation and compute the average standard deviation from the de-trended mean.

The average variation is +/- $4,934, which is 5.4% of the median withdrawal between age 72 and age 91. In other words, Alice and Bob would be expected to cope with annual variations of 5% to gain additional withdrawals of 26%. Although Alice and Bob's portfolio withdrawals may fluctuate, their CPP and OAS pensions will not, so the total impact on their budget would be less.

If Alice and Bob wanted to reduce the income variability, they could do so by increasing the allocation to bonds in their portfolio, although this would reduce their expected return and their average withdrawal.

4 Party until the lights go out?

Thus far, we have assumed that Alice and Bob need their after-tax income to keep pace with inflation. However, as noted above, studies in Canada and elsewhere have concluded that retiree spending typically declines with age at between 1 and 2% per year—offsetting our projected 1.7% inflation rate. So, by removing the requirement that withdrawals keep pace with inflation, we can assess the impact of withdrawals that track actual retiree behaviour.

Table 1

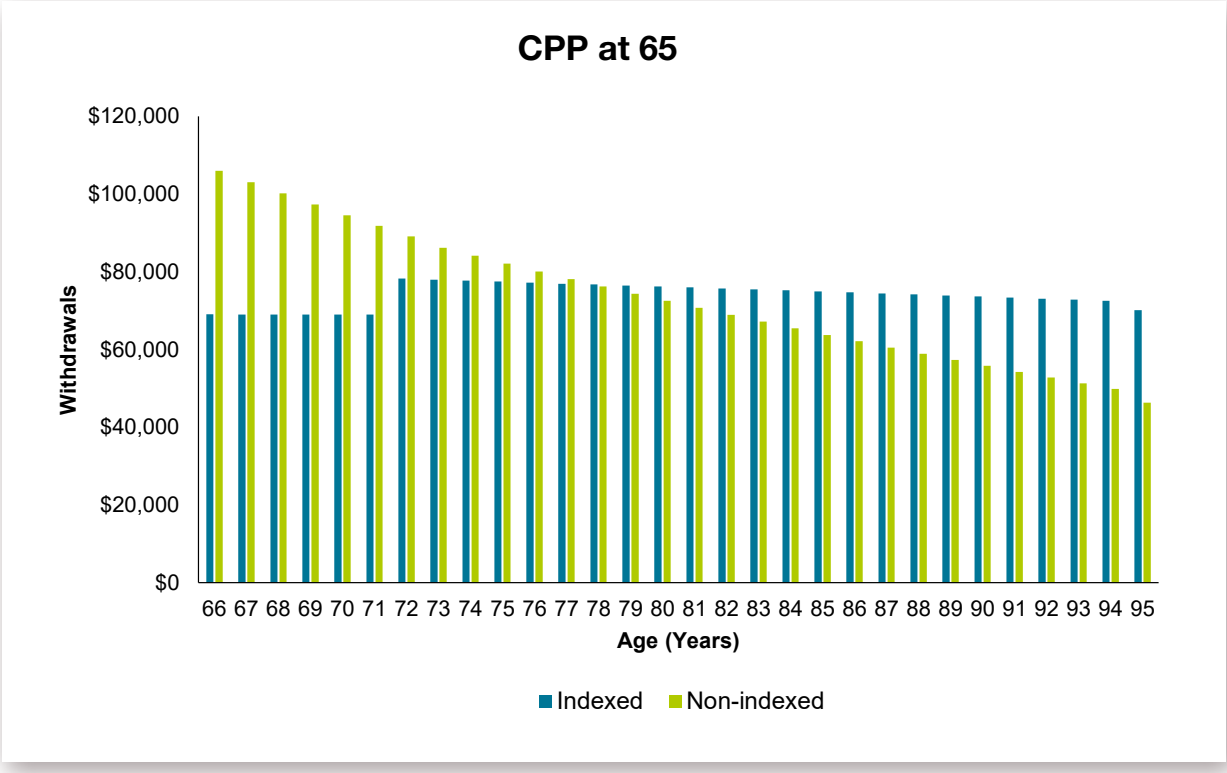
CPP timing	Inflation indexed	No inflation indexing
CPP at 65	$93,000	$117,600
CPP at 70	$97,200	$120,000

Source: PWL Capital

Table 1 shows that the impact of relaxing the requirement that expenditure increases with inflation. Previously we calculated that when the CPP pension was taken at age 65, then Alice and Bob could spend $93,000 annually, indexed to inflation. Without inflation indexing the amount spent is $117,600. The trade-off is that buying power declines with time. For example, when CPP is taken at age 65, by age 95 the buying power of $117,600 is reduced to $70,920 in today's dollars.

Figure 3 shows the withdrawals in today's dollars. Removing inflation indexing changes the shape of the withdrawal curve so there is more income earlier in retirement. The total withdrawals over the retirement period do not change significantly.

Figure 3



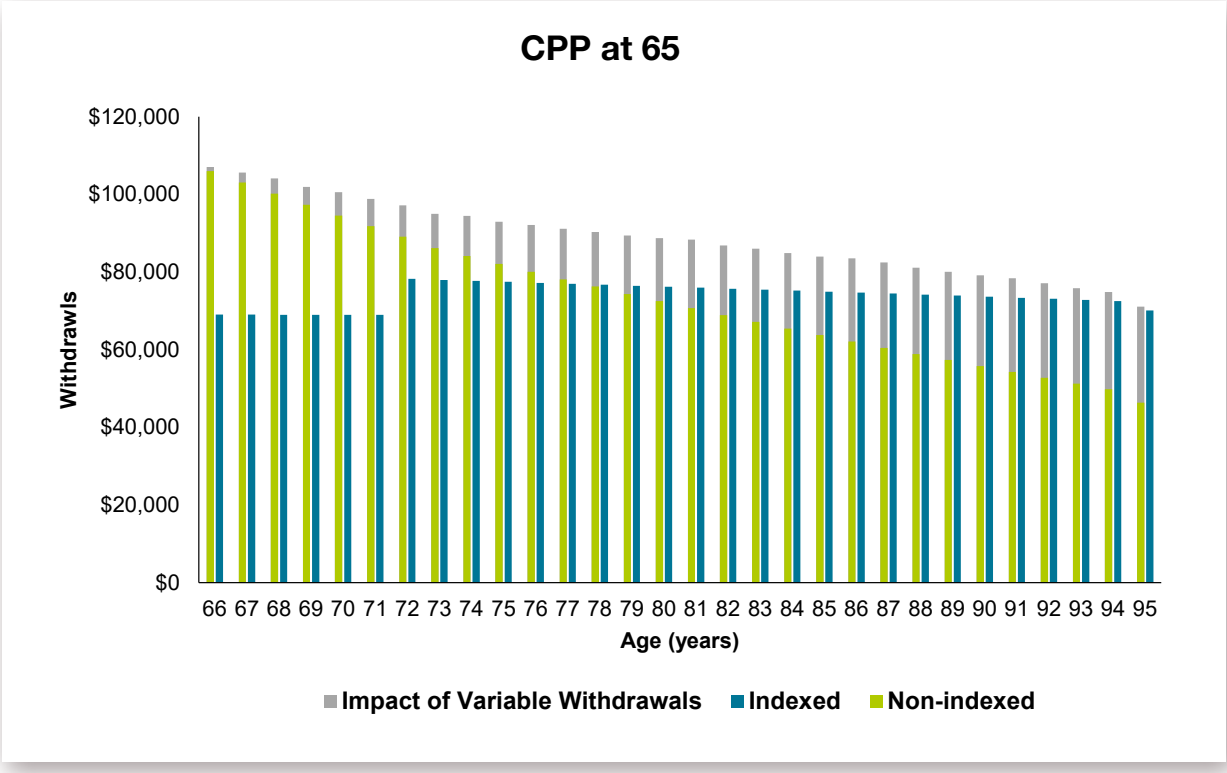
Source: PWL Capital

The impact of introducing variable spending, using ARVA, is seen in the grey bars in Figure 4. While removing indexing increases early withdrawals at the expense of later withdrawals, ARVA has an increasing impact with time. The combined impact of removing indexing and allowing variable withdrawals improves the median withdrawals throughout the retirement period.

The total withdrawal from a combination of non-indexed and variable withdrawals is 20% more than indexed and constant withdrawals. Assuming a 30% marginal tax rate in retirement this equates to a 14% increase in expenditure. By way of comparison, a portfolio that did not use variable withdrawals and maintained inflation indexing would have to increase annual investment returns by 1.25% to generate the same pre-tax income.

We could present similar calculations for taking the CPP pension at age 70. For brevity, these are omitted but available from the author.

Figure 4



Source: PWL Capital

5 Conclusion

We have examined the impact of CPP timing, allowing flexible withdrawals and relaxing the requirement that withdrawals be indexed to inflation. Delaying CPP increases Alice and Bob's retirement expenditure by 4.5%. This should be a serious consideration for most investors with average life expectancy.

Allowing withdrawals to vary according to market changes using ARVA, increased Alice & Bob's withdrawals from their invested assets by 24% to 26%, depending on when they take their CPP.

Allowing purchasing power to reduce with age by 1.7% per year (the assumed inflation rate) did not change the total withdrawals significantly but did allow higher withdrawals in the early years while lowering withdrawals in the later years. Allowing variable withdrawals compensated for the decline in later years and yielded an increase in withdrawals throughout retirement for Alice and Bob. The combined impact was equivalent to generating an additional 1.25% return annually from the portfolio.

Decisions about CPP timing, variable withdrawals and expenditure over retirement all have a significant impact on total income in retirement. Each of these factors can be used to not only increase how much retirees have to spend in total, but also how the spending is distributed throughout retirement. Most importantly, these are options available to all retirees.

Appendix A

Extending ARVA to non-uniform payouts

We are familiar with constant payouts from pensions and annuities, but payouts may also be non-uniform because of other sources of income or a desire to spend more at different periods in retirement. Of course, there is no free lunch; increasing payouts for one period means lower payouts at other times.

In the absence of commercial planning software that incorporates non-uniform payouts, we take the median payout without using ARVA, and use these payouts as weights in the ARVA scheme. We illustrate with an example.

The portfolio value is $100,000. Payout is over five years and the real return, or discount rate, is 3%. ARVA calculates a constant payout of $21,199, as illustrated in Table A1.

Table A1

Year	Beginning portfolio	Real cashflows	Ending portfolio	Cashflow weights	Present values
1	$100,000	$21,199	$81,165	0.2000	$21,199
2	$81,165	$21,199	$61,764	0.2000	$20,582
3	$61,764	$21,199	$41,781	0.2000	$19,983
4	$41,781	$21,199	$21,199	0.2000	$19,401
5	$21,199	$21,199	$0	0.2000	$18,835
	Total	**$105,997**		**1.0000**	**$100,000**

Source: PWL Capital

In this example, the total cash paid out is $105,997, where $5,997 is the real return earned on the declining balance.

Suppose there is a preference for a different cashflow weight as specified in Table A2. In this example, spending is high initially and then declines. Then, we can compute modified real cashflows that satisfy the new weighting.

Year	Beginning portfolio	Real cashflows	Ending portfolio	Cashflow weights	Present values
1	$100,000	$31,336	$70,724	0.3000	$31,336
2	$70,724	$26,114	$45,949	0.2500	$25,353
3	$45,949	$20,891	$25,809	0.2000	$19,692
4	$25,809	$15,668	$10,446	0.1500	$14,339
5	$10,446	$10,445	$0	0.1000	$9,280.60
	Total	**$104,454**		**1.0000**	**$100,000**

Table A2

Source: PWL Capital

We use the median real cashflows from the financial planning software to generate the cashflow weights in the ARVA calculation.

Currently, we are limited to a two-step approach, which consists of calculating the median income without ARVA and then running the ARVA calculation separately. Performing all the calculations simultaneously would provide a more detailed estimate of the impact of ARVA on after-tax income. Where the additional withdrawal due to ARVA is a fraction of the total withdrawal, we consider the impact to be small. In practice, the adjustment to spending each year would be calculated based on the actual portfolio value and real interest rate.

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The Author

Graham Westmacott MBA, CFA
Portfolio Manager

PWL Capital Inc.
www.pwlcapital.com/profile/graham-westmacott
gwestmacott@pwlcapital.com

CONTACT GRAHAM

PWL

www.pwlcapital.com

PWL Montreal
3400 de Maisonneuve O.
Suite 1501
Montreal, Quebec
H3Z 3B8

T 514.875.7566
1-800.875.7566
F 514.875.9611
montreal@pwlcapital.com
www.pwlcapital.com/montreal

PWL Ottawa
265 Carling Avenue,
8th Floor,
Ottawa, Ontario
K1S 2E1

T 613.237.5544
1-800.230.5544
F 613.237.5949
ottawa@pwlcapital.com
www.pwlcapital.com/ottawa

PWL Toronto
8 Wellington Street East
3rd Floor
Toronto, Ontario
M5E 1C5

T 416.203.0067
1-866.242.0203
F 416.203.0544
toronto@pwlcapital.com
www.pwlcapital.com/toronto

PWL Waterloo
20 Erb St. West
Suite 506
Waterloo, Ontario
N2L 1T2

T 519.880.0888
1-877.517.0888
F 519.880.9997
waterloo@pwlcapital.com
www.pwlcapital.com/waterloo