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VISION

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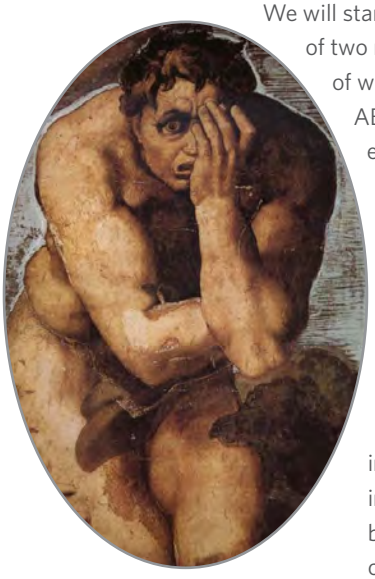
Are DC Pension Plans Too Risky?

By Fred Vettese, Chief Actuary

Defined Contribution (DC) pensions are often dismissed as being too volatile to meet the needs of individuals or the organizations that employ them. Five years ago, we tried to quantify that volatility (see our April 2008 *Vision* "Pensions After DC", still accessible at www.morneaushepell.com). Much has happened since then, including the ongoing financial crisis and some new thinking on income replacement ratios, all of which has prompted us to refine our model and re-examine our conclusions. While DC pensions will never be predictable, the variability in payouts is likely to remain at least tolerable. As Target Benefit Plans and other hybrids are about to be launched it is important to have a clear understanding of what DC plans can deliver.

A TALE OF TWO SIDNEY'S

Even though Defined Contribution (DC) pension plans have surged in popularity over the past 20 years, they continue to trouble industry observers. DC plans are almost universally perceived as imposing too much risk on employees, although a clear demonstration of this statement is rarely presented. While there is no shortage of anecdotal evidence, it is neither scientific nor conclusive. Stochastic methods could be used to simulate future performance under DC plans and map out a distribution of possible outcomes but the result is only as good as the input. Yet another approach, and the one we will employ in this *Vision*, is to consider what would have happened historically had DC plans always been around. This approach is the most easily understood and has the advantage of relying on actual rather than simulated data.



Sidney receives his 1975 pension statement

We will start by relating the experience of two retirees, father and son, both of whom spent their careers at ABC Company, albeit in different eras. Sid Sr. retired in 1975 after participating in the ABC Company DC pension plan for 30 years. He was a victim of bad timing, due to the lingering impact of the 1973-74 bear market and the effects of rising inflation. As a result, the indexed annuity Sid could buy in 1975 with his DC account balance barely replaced 15% of his average pay in his final 5 years of employment.

Sidney Jr. retired in 2001, and apart from general wage inflation, had the same earnings and retirement record at ABC Company as his dad. At retirement, he also purchased a fully indexed annuity. Sidney Jr., however, benefited from a much more benign economic environment. He was able to buy an annuity that replaced 55% of his final average pay, more than 3½ times what his father received!

DETAILS OF THE ABC COMPANY DC PENSION PLAN

The ABC Company DC pension plan was established in 1938, 8 years before the date that Sid Sr. joined the plan. The Plan required contributions of 8%, split equally between the employee and the employer. The hope was that this 8% contribution would be enough to purchase a fully indexed pension of 30% of final average 5 years' pay after 30 years of service. This 30% target when combined with OAS and C/QPP provided about 50% of final average pay (we will assume that OAS and C/QPP always existed in their present form.) This was deemed sufficient to replace 100% of pre-retirement consumption in the case of a middle-income employee who was paying off a mortgage and raising children for most of his career (see our January 2011 *Vision* for more detail).

The ABC pension fund maintained a constant asset mix – 60% in Canadian and U.S. equities and 40% in long bonds – with returns before fees matching the benchmark indices. Investment and administration fees of 100 basis points (1% of fund assets) were deducted from the total return each year. Account balances at retirement were assumed to buy annuities that were fully indexed to inflation – and guaranteed for 10 years – though members could opt to transfer their accumulation into a LIF instead. Our simulation model used annuity rates and inflation expectations that would have prevailed in the year of retirement.

Sid Sr. participated in this plan from 1946 to 1975 while Sidney Jr. participated from 1972 to 2001. Both retired at age 63 and both had final pay that was a little less than two times the average national wage.

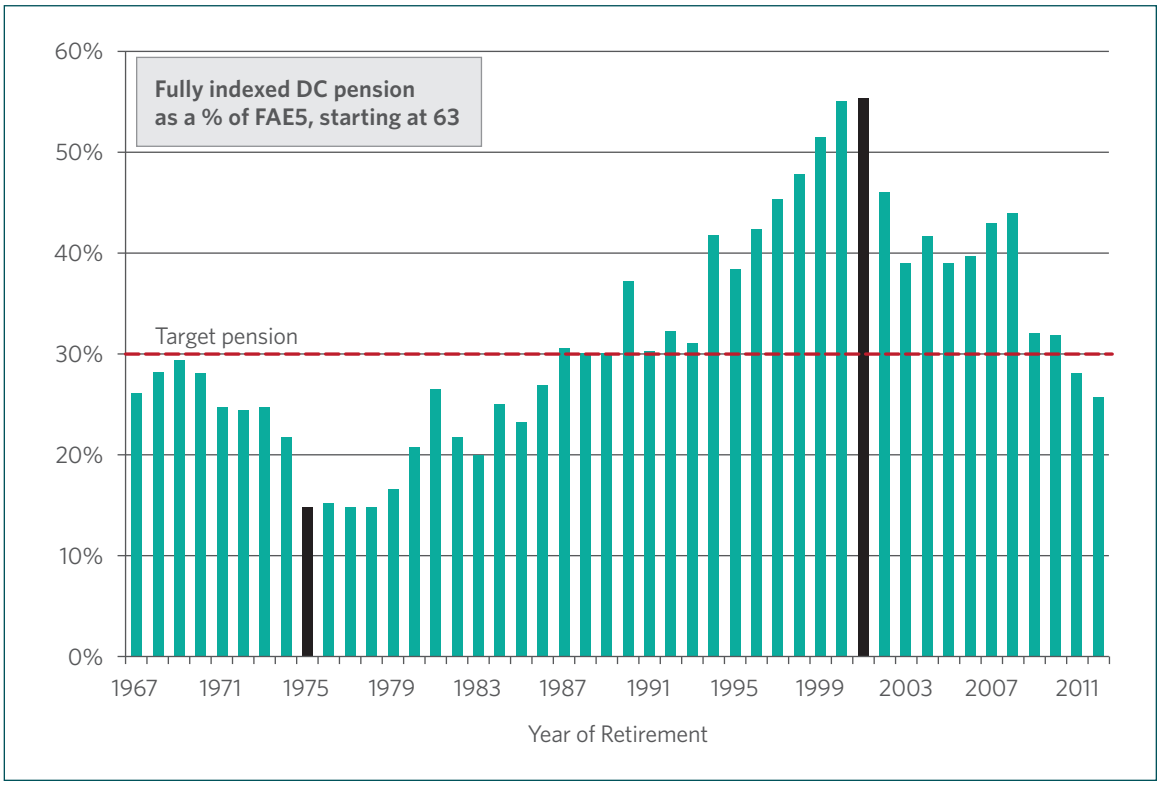
Sid Sr. and Sidney Jr. respectively picked the worst of times and best of times in the past half century to retire from a DC plan. This is shown graphically in Figure 1. Each bar represents the outcome after a 30-year accumulation period, depicting the pension as a percentage of final average pay that could have been purchased with the DC account balance at age 63. In total, there are 46 overlapping 30-year periods starting with 1938-1967 and going to 1983-2012. The two bars in black highlight the situation in 1975 and 2001 for Sid Sr. and Sidney Jr. respectively.

The broken line in Figure 1 represents ABC's pension target. The deviations from the target line are substantial, with the pension reaching only half the target in the worst case and nearly double the target in the best case. These extreme fluctuations are due not only to the vagaries of the capital markets but also the effects of wage inflation and price inflation. When inflation is high, DC plans perform especially poorly.

WAYS TO REDUCE VARIABILITY

On the face of it, a pension benefit that varies so wildly seems unacceptable since it makes it difficult to plan for one's retirement. There are a number of measures that employees can take to reduce the variability in their DC pensions. As we will show below, some measures are more effective than others.

Figure 1
THE DC ROLLER COASTER



STRATEGY 1 – DELAY RETIREMENT

For starters, the employee could choose to work a little longer before retiring. This would give time to contribute more and re-build one's DC account balance. It would also buy some time for the capital markets to recover.

Unfortunately, this strategy does not work in every situation. Some imminent retirees may not want to work longer or may not have the physical capacity to do so. Moreover, capital markets do not always co-operate and the employee might be worse off by delaying retirement. For instance, an employee who reached age 63 in 1972 would have earned a DC pension of just 24% of final average pay. If he decided that was not enough and worked two years longer as a result, his DC pension would have dropped to 22% because of the 1973-74 bear market.

Similarly, an employee who contemplated retiring in 2009 might have been dismayed to see that her potential annuity had dropped from 44% of final average pay in the previous year to 32%. As in the previous example, she might have opted to work another two years. Even though the stock markets recovered strongly, a drop in interest rates more than offset it; as a result, her annuity would have dropped to 28%.

Nevertheless, the strategy of delaying retirement would have helped most of the time, as in Sid Sr.'s case. Had he worked two years longer (until 1977), his pension would have grown from 15% to 18% of final average pay.

STRATEGY 2 – REDUCE ANCILLARY BENEFITS

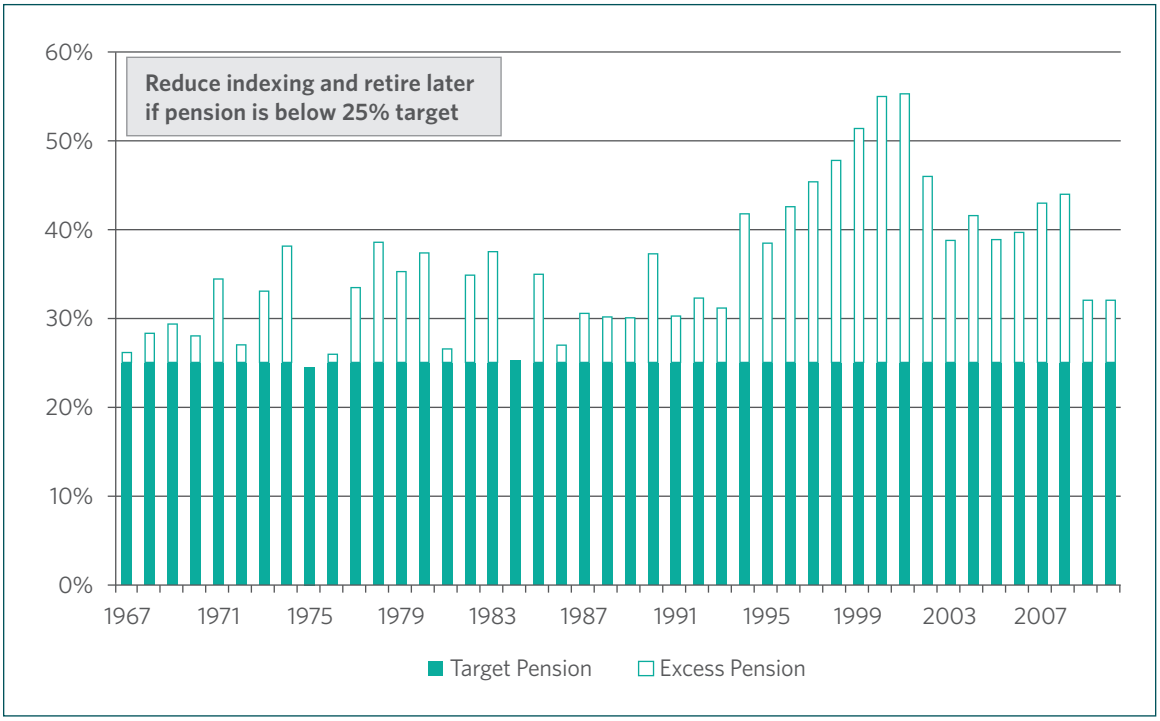
Another strategy is to settle for an annuity with reduced ancillary benefits. Providing for automatic annual increases for inflation (i.e. indexing) is especially expensive. Rather than buying a fully indexed annuity, Sid Sr. could have opted for an annuity that was indexed to just 50% of the annual change in inflation. He will eventually lose some purchasing power but his initial retirement income is much higher as a result. When coupled with the two-year delay, his annuity now is 24.4% of final pay, which is at least within shouting distance of the 30% target. If we assume in general that all long-term employees of ABC Company postpone retirement for 2 years and select a 50% indexed annuity whenever their pension at age 63 is less than the 30% target, the problem of low pensions is greatly alleviated, as is shown in Figure 2.

Settling for partial indexing is not as bad as it might sound. The vast majority of private sector DB plan sponsors provide only partial indexing, whether on an ad hoc or an automatic basis and the usual target in these cases is to restore about 50% of the change in CPI. Research has shown that people consume significantly less in the later stages of their retirement (see pages 87-89 of "The Real Retirement") and since OAS, GIS and C/QPP are fully indexed, partial indexing of pensions from employer-sponsored plans is usually sufficient to meet the needs of older retirees.

STRATEGY 3 – SET THE RETIREMENT TARGET CONSERVATIVELY

Another way to limit the prospect of disappointment is to be conservative in setting the target income for the DC plan. The ABC Company set its pension target at 30% of final average pay, based on an 8% contribution over 30 years. Perhaps this was a shade too aggressive given that the target pension under the C/QPP is just 25% of indexed career-average earnings with a 9.9% contribution and 47 years of accumulation. Assuming a lower target increases the chances of success and it is no surprise that most of the volatility will now be *on the upside*. This is shown rather dramatically in Figure 2 where we have lowered ABC's pension target to 25%. The clear part of each bar shows the extent to which the pension for that period exceeds the 25% target.

Figure 2
THE VIRTUE OF SETTING A REALISTIC DC PENSION TARGET



In only one 30-year period is the DC pension still below the 25% target (the period ending 1975) and in most periods, the employee did not even have to work longer or settle for partial indexing to achieve the new target. A surprise on the upside is more likely to be regarded as a windfall rather than as a volatility problem.

While setting the target conservatively seems like a simple trick, it goes a long way toward managing employee expectations and avoiding disappointment at retirement. ABC Company can now claim to have done well in delivering the target pension within its DC plan.

There are two other strategies that one would think should mitigate volatility in DC pensions but that history shows would have been quite ineffective.

STRATEGY 4 – LIF VERSUS ANNUITY

In all the calculations so far, we have assumed that retirees will buy an annuity. This may seem an artificial assumption since it is something that precious few retirees do with their DC plan balances. By far the more common approach is to transfer one's money to a Life Income Fund (LIF), which is a tax-sheltered vehicle from which one withdraws an annual income.

Most people shun annuities, mainly because they involve a loss of control of one's accumulated wealth and because so many Canadians seem to have a fundamental distrust, if not outright dislike, of insurance companies. This sentiment may be unwarranted but it is still difficult to overcome. Another objection to annuities is that they would seem to rely too heavily on interest rates at the point of retirement. If interest rates dip at the point in time when one is buying an annuity, the resulting annuity will be lower for the rest of one's life.

Besides less year to year volatility, one would also surmise that a LIF should provide higher retirement income on average than an annuity since the LIF can continue to invest in equities and insurance company expenses are avoided in the process.

If one looks back in time, these perceived advantages of a LIF turn out to be illusory. Figure 3 compares what annuities would have produced historically versus LIFs (had LIFs always been in place).

If we compare retirees in each year between 1967 and 2000, annuities would have produced significantly more income than LIFs in all but five of the 30-year periods and about the same level of income in the other five periods.

This result was surprising for a number of reasons. First, the LIF was assumed to be invested 50% in equities and 50% in bonds with a management fee of just 1% per annum. This is a better configuration than most LIF-holders enjoy and sounds like it should have produced better returns than an annuity.

Second, we skewed the simulation of LIF income in a way that should have made the LIF option look better. At the point of retirement in each 30-year period, we used our knowledge of what the capital markets and inflation actually did in the subsequent 12 years to reverse-engineer how much income could safely be withdrawn from the LIF and still leave enough money in the LIF to buy an annuity at age 75. In spite of all that hindsight, the annuity still did better.

Finally, we assumed the LIF income would only be fully indexed until age 75 (for the sake of simplicity) and then partially indexed, whereas the annuity income was fully indexed for life and even then the LIF option didn't compare well.

The superior performance of annuities has to do with the pooling of risk. To the extent annuity-holders die early, the value of their remaining assets (net of any guaranteed payments) notionally falls back into the pool, a fact which enables insurers to provide a larger annuity in the first place.

The conclusion is that drawing retirement income from a Life Income Fund does not produce a higher average payout nor does it reduce year-to-year variability in any meaningful way. Annuities are a surprisingly good option, with the added advantage that they eliminate the worry of outliving one's savings.

Figure 3
ANNUITIES HAVE BEEN BETTER THAN LIFs

STRATEGY 5 – INVEST MORE CONSERVATIVELY

It stands to reason that retirement income under a DC plan would be more predictable, albeit not as high on average, if one adopts a more conservative asset mix in the final few years before retirement. A higher fixed income weighting should reduce the volatility of returns and also the variability in the amount of the annuity that can be purchased. Once again, when this idea was tested against historical data, the result was surprising.

We compared two scenarios. In the base scenario, the DC fund is invested 60% in equities and 40% in long bonds in all pre-retirement years up until an annuity is purchased. This is also the scenario underlying all the foregoing charts. The alternate scenario assumes the equity weighting is reduced to a more conservative 30% in the final 5 years before retirement. As Figure 4 shows, adopting a more conservative asset mix makes surprisingly little difference. Historically, it would have hurt just as often as it helped, and when DC pensions were especially low (the mid-1970s) it didn't help at all.

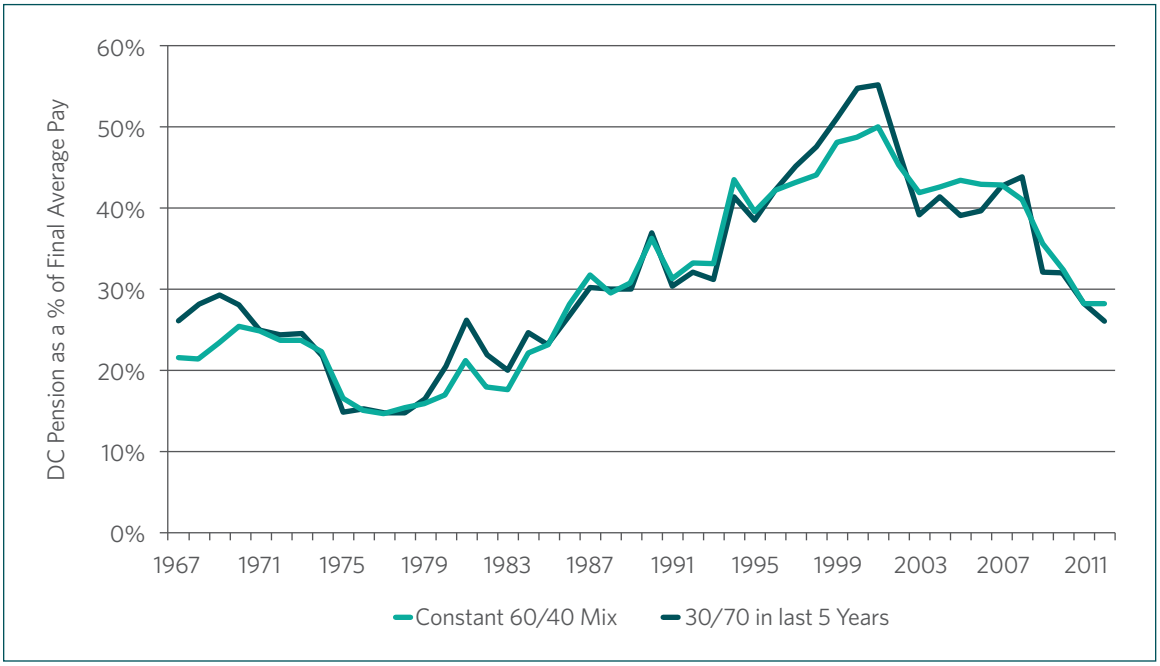
CONCLUSIONS

The income that could have been generated by a DC plan over time has been more variable than is desirable but the end result is not so bad if one sets the retirement income target conservatively low and is prepared to live with surprises on the upside. Apart from cutting ancillary benefits, the most widely accepted methods to reduce the variability in DC pensions would have been surprisingly ineffective historically.

In spite of some severe market swings since 2000 and a major decline in interest rates that have made annuities more costly, DC plans have proved to be more durable than the many critics of DC plans had predicted. We envision no rush back to DB plans whether future investment performance is exceptionally good or exceptionally bad. The question is whether Target Benefit Plans or Shared Risk Plans – which a growing number of jurisdictions are starting to consider allowing – are sufficiently better to persuade DC plan sponsors to switch to them. This will be the subject of the next *Vision*.

Apologies to Charles Dickens and Michelangelo.

Figure 4
INVESTMENT CONSERVATISM HASN'T PAID OFF



Appendix
Assumptions Used in the Pension Projections

Some readers may recall that we made similar projections in our April 2008 *Vision*. The methodology has been tweaked since then in the following ways:

- We now express pension as a percentage of final 5 years' average earnings (FAE5) rather than just the earnings in the final year. FAE5 is a more stable figure and more representative of the lifestyle people expect to maintain in retirement.
- We have refined the trajectory of an individual's pay in the final 10 years before retirement to reflect slower growth in earnings with advancing age, which is the typical situation.
- We have changed the asset mix to 60% equity/40% bonds instead of 50/50. The 2008 *Vision* had shown that a higher equity exposure was almost always better over 30-year periods, and that will probably be true in the years to come given today's historically low bond yields.
- We now assume retirement at age 63 instead of 61 since later retirement is becoming the new normal.
- At retirement, it was assumed that account balances would be used to buy fully indexed annuities unless indicated otherwise. Previously we assumed partial indexation.

Here are some key assumptions that have not changed:

- The annual investment management fee will be 1% (100 basis points). This may be high for large plans and low for smaller ones.
- Annuities will be guaranteed for 10 years. This ensures the retiree and his or her beneficiaries will recoup most of the cost of the annuity even in the event of early death.

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Statistics	Compendium of pension and benefits statistics	Annual
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Summary of Pension Legislation	On-line detailed summary of differences in pension legislation by jurisdiction (published by CCH)	

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MORNEAU SHEPELL

morneaushepell.com
info@morneaushepell.com