

Applying life-cycle economics: an income-oriented DC retirement solution that integrates accumulation and payout phases

Professor Robert C. Merton
School of Management
Distinguished Professor of
Finance, Sloan School of
Management, Massachusetts
Institute of Technology

Moving from defined benefit (DB) pensions to defined contribution (DC) schemes typically shifts the focus of members from income to investments. The focus is no longer on realising sufficient replacement income to allow the member to maintain a certain lifestyle in retirement, but on the size of the DC accumulation, how that accumulation should be invested, what returns may be expected from that investment and how volatile those returns may be.

And yet the needs of members do not change. They still need sufficient replacement income when they retire, and they are anxious to know whether they are likely to achieve it as they save for retirement. The members themselves do not change either. Typically, they are not engaged, and if they do engage they are not equipped to deal with the complexities of managing their retirement savings.

Against this background, I have on numerous occasions presented the case for a redesign of our DC schemes, including the design criteria that need to be met.¹ The core criteria are:

- targeting the income that members need in retirement and managing the risk that their targeted income will not be realised
- achieving this through individually tailored strategies, which do not require member engagement
- providing only meaningful information and choices when members do engage.

In this paper, we develop a system of guidance to members about the optimal structuring of the pay-out of their DC accumulation and the financial instruments to implement it. In the post-retirement phase, as in the accumulation phase, we focus their minds on an income goal and on the risk of not achieving it. Here too, we provide individually tailored strategies that do not rely on member engagement, and provide meaningful information and meaningful choices when members do engage. The effectiveness of the post retirement design is not independent of the accumulation-period design. In this respect, there should be a continuity concept and strategy from saving for retirement through dissaving in retirement.

Few members have clear ideas about their detailed retirement needs until they are close to retirement, and I will therefore maintain a clear separation between managing retirement savings and managing retirement payouts. Prior to my discussion of the optimal structuring of a member's payout in section 3, I first discuss the accumulation phase in section 2. This will set the scene for my proposed structuring of the payout phase and the choices this implies. My proposal aims to integrate income drawdown and annuitisation in a coherent fashion, while providing an integrated perspective on other sources of retirement income, such as state benefits, DB pensions and working after retirement. Section 4 presents a summary.

Redesigning DC

A DB scheme is conceived to provide members *with an income*. It is managed to provide members *with an income*. And because this motivation filters right through the scheme, members think of their benefits *in terms of income*. Ask a DB member what his pension is worth and he will reply with an income figure – ‘two-thirds of my final salary’, for example. The language of DC is very different. Asset value is the metric, its growth is the priority. Everything flows from this. Members are taught to understand their appetite for investment risk and be wary of asset value volatility instead of income volatility. Their annual statement highlights their investment return and account value.² As a result, ask a DC member what his pension is worth and you are likely to hear a cash amount and perhaps a lament to the value lost to the financial crisis.

The issue here is a confusion of means and ends. Of course, you need a pot of money to buy a retirement income, but the pot is the means to an end, not the end itself. Confusing the two can lead to costly mistakes. The size of the pot measured in wealth terms is not sufficient to tell one how much retirement income the pot produces. That depends on interest and longevity rates. Yet, common practice in the industry is to think of a DC pension account purely as a means to accumulate assets, not as a means to achieve an income goal. Consequently, most DC schemes are designed and operated as investment accounts, and member communication is entirely framed in terms of assets and returns. Indeed required disclosures focus on value changes and not changes in income. The income that the member will need to maintain his lifestyle when he finishes working is almost an afterthought that is only considered in any depth at the eleventh hour.

If the focus in DC plan design is shifted away from asset growth towards achieving the real, ie inflation-corrected, retirement income that members need to maintain the lifestyle that they have gotten used to during the later stages of their work life, some other things will have to be changed as well, most notably how risk is measured and hence managed and how we communicate with members. The risk concept used in current conventional DC schemes is investment risk or capital loss and the volatility of returns. If good member outcomes are the goal, and good member outcomes are measured

in income terms, investment risk is simply the wrong concept of risk. Therefore, communicating to members in terms of value of assets and returns is unhelpful, perhaps even misleading. As a case in point, an increase in wealth derived from high investment returns that are a result of declining interest rates may make members feel good about their retirement prospects. But low interest rates are the enemy of a person seeking income and their situation is actually getting worse, not better!

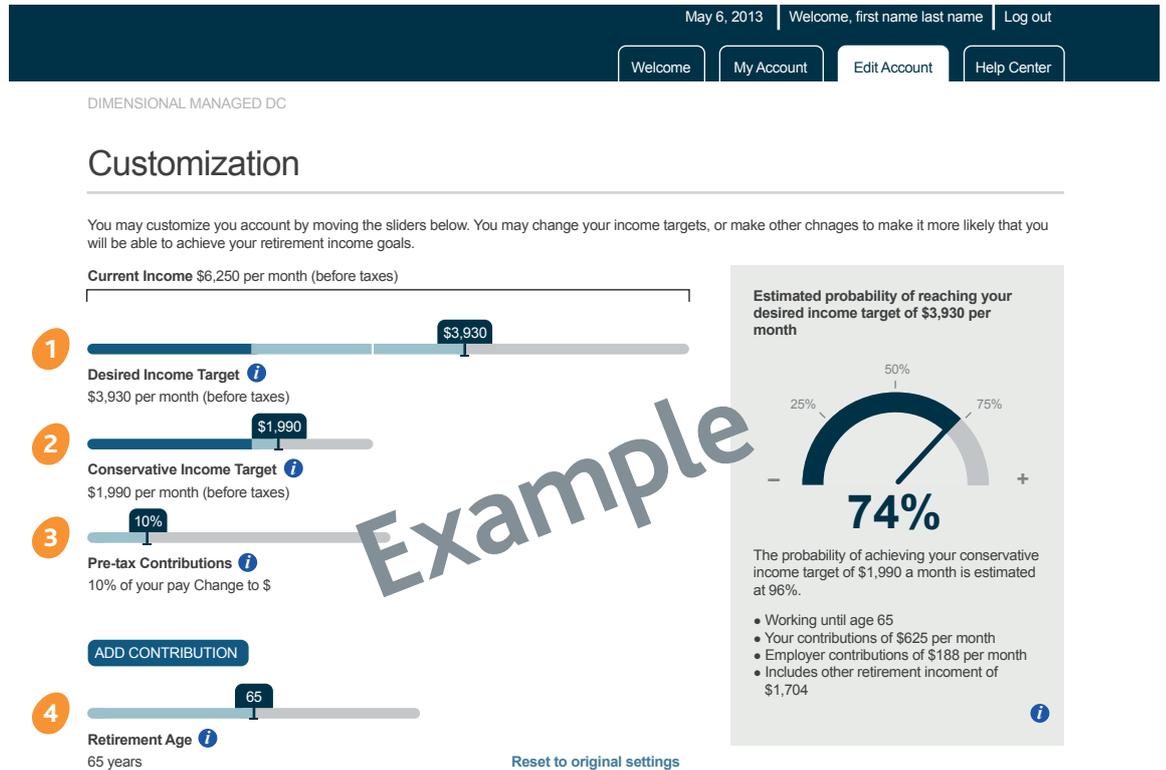
We should think of the number one risk in DC schemes as the risk of not achieving an adequate retirement income and we should change investment strategies and member communication accordingly. Shifting the focus from pure asset accumulation towards income helps members understand why they are saving, and what the chances are that their retirement goals will be achieved, respectively what they can do to improve them. And when managed accounts are provided, as I have proposed, the required investment strategies will be determined and executed without requiring member involvement, so that the choices that remain can be kept fairly simple and meaningful. Basically, the choices that I propose relate to only four questions:

1. What is your desired lifetime income target?
2. What is the minimum income that would still be acceptable to you when it turns out that your desired income cannot be realised?
3. How much money are you willing to contribute yourself – on top of any contributions paid by your employer?
4. When do you plan to retire?

These choices may be presented in a very user-friendly online planning tool with immediate feedback in terms of their impact on the estimated probability of achieving the member’s desired income goal. For example see figure 1 on page 66.

When members are not sufficiently engaged to login to this online planning tool and answer those questions, default answers may be provided for each member, taking into account any information about them that is available in the scheme administration. Typically, not only age should be taken into account, but also salary, gender, current balances and possible other sources of retirement income such as state benefits, legacy DB rights and, most notably, future contributions.

Figure 1: Customisation of plan settings using a user-friendly online planning tool



Irrespective of whether default desired income and minimum income settings are provided for the unengaged, or members engage and opt for further customisation, a liability-driven investment strategy will be implemented with the aim to improve the likelihood of achieving their desired income, while accepting only minimal risk of not achieving their minimum income requirement. This objective function is illustrated in figure 2 on page 67.

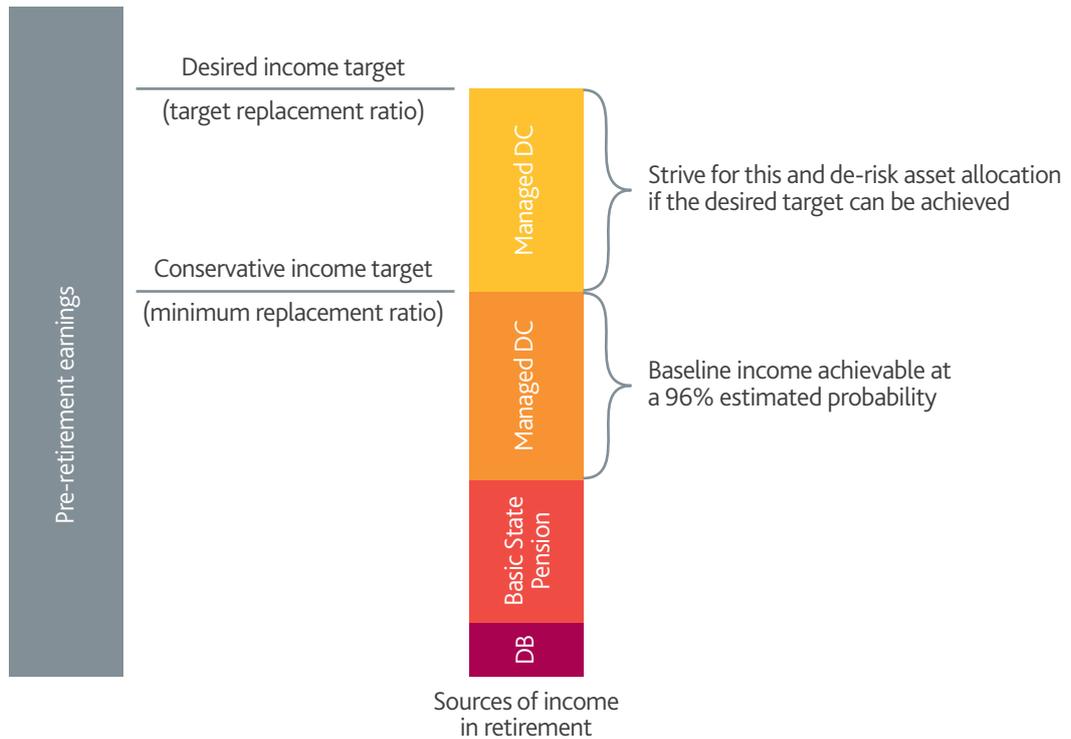
In view of this objective function, the Managed DC solution that I am proposing here first determines the allocation of the member's total assets³ to an inflation-linked duration-matched fixed-income portfolio that will be required to achieve the member's conservative income target with a 96 per cent estimated probability. It then uses the remaining assets to improve the estimated probability of achieving the desired income target. Investment risk is measured in terms of uncertainty about income in retirement and not wealth. The Managed DC strategies are explicitly designed to manage inflation and interest rate risks as well as asset price risks. Investment risk will only be taken when it is needed to reach

the member's income target. As the portfolio income draws close to the goal, where taking risk is no longer needed, the member's exposure will be gradually reduced. This dynamic strategy narrows the distribution of possible outcomes for the member, and thus reduces the estimated uncertainty about his retirement payout.

Managed DC post-retirement income solution

Consistent with focusing the accumulation phase on the member's real-income target, integrated with other sources of retirement income, I propose to structure their payout choices also with an income target in mind and manage the risk of not achieving it without requiring member involvement. It may thus be designed as a seamless continuation of the Managed DC solution that I am proposing for the accumulation period, offering only meaningful choices expressed in terms of inflation-protected income.⁴ While the income goals in the accumulation period are expressed as annuity-like income payments for life, when members reach retirement they will face individually different circumstances, including

Figure 2: Liability-driven investment objective function is to seek to maximize the estimated probability of achieving the member’s desired income goal subjective to their conservative income constraint



their health, post-retirement work plans, personal saving, and dependants. The Managed DC post-retirement offering therefore allows the member to customise his payout phase to address these individual circumstances by selecting a mix of three types of income streams.

Level 1 income - guaranteed for life

Level 1 type income provides inflation-protected income, guaranteed for life, and thus eliminates longevity risk, interest rate risk and inflation risk. State benefits and inflation-indexed DB pensions, if any, are included in this category. If the member retires before he is eligible for state benefits or he decides to delay starting state benefits to earn a higher benefit, then DC assets will be used to create a 'bridge' stream of income in place of the state pension component until state benefit payments begin. For members in good health who anticipate a long retirement, this delay in state benefits may significantly boost overall retirement income.

The member who wants a larger amount of level 1 income uses DC assets to buy an inflation-protected life annuity from a highly rated

insurance company. The annuity may provide a joint survivorship feature for a spouse but provide no other death benefits. The income received from the annuity will reflect the extra 'mortality dividend' from risk pooling by giving up the assets when they are no longer needed.

As the member may have become used to the Managed DC focus on level 1 income targets during the accumulation period, he should be comfortable with the concept when making choices at retirement. Those who have achieved the desired income goal that was targeted during the accumulation phase may choose to place all or most of their accumulation into level 1 income because it is simple and provides the largest safe income stream for life. However, level 1 income carries the cost that it is inflexible and allows for no liquidity to alter the income stream if circumstances change or there is an unanticipated demand for a lump sum of money. Some members will be uncomfortable making this irrevocable decision and giving up control over the bulk of their retirement assets. For them, partial annuitisation may be a better option. There

is empirical evidence that participants are more likely to annuitise at least something when they are not required to fully annuitise.

Level 2: conservative income

Level 2 type income, like a fixed-time annuity, provides a periodic payout of inflation-protected income, for a fixed time horizon. As a likely default the horizon may be set at the life expectancy of the participant as of the time of retirement. The assets assigned to level 2 income are invested in an inflation-indexed fixed-income portfolio that is duration-matched to the targeted stream of payments, in the same process and in the same funds (plus a shorter duration fund) that are used for the 'risk-free' asset replication of the conservative income goal in the Managed DC plan in the accumulation period. Thus, payouts are made based on a 96 per cent estimated probability of being able to make those payments, creating, in effect, a reserve to cover imperfect hedging. Hedging of level 2 income payments should be more accurate than that of the conservative income goal in Managed DC during the accumulation period because the duration of the level 2 income will be materially shorter than during the accumulation period and all the assets used to support level 2 incomes will be investable funds (rather than also including future contributions).

There are two advantages of level 2 income relative to level 1 income. Because the funds are held in liquid mutual funds, the assets supporting level 2 income are available in whole or in part to the participant at any time, either for alternative investments or expenditures. Except for spousal survivorship annuity, state benefits and DB rights, level 1 income provides no bequest assets for the participant. All the remaining assets supporting level 2 income are available for bequests at the participant's death.

There are two disadvantages of level 2 income relative to level 1 income. Unlike level 1 income, the income payouts in level 2 are not guaranteed, although the assets held against these payments are 'immunised' with sovereign bonds so that the remaining exposure to market risk should be very small. Also, because the maturity of the annuity-like payments is fixed, there is no protection against longevity risk.⁵

To help members to decide on the amounts of level 1 and level 2 income they would prefer, the

process begins by setting 100 per cent of assets into level 1 income to determine the maximum amount of guaranteed life income available. The member may then move a slider, similar to the sliders in the online planner tool shown in figure 1, to increase the amount of level 2 income, which automatically reduces the amount of level 1 income and changes the total amount of income available from the combined level 1 and level 2 until the date at which level 2 income ceases, when only level 1 income continues.

In this fashion, members will see the trade-off between liquidity and bequest versus longevity protection and the extra income from the mortality 'dividend'. As in the accumulation phase, there are preset default allocations for those members who are still not engaged at retirement.

Level 3 : desired income

Many members are likely to find the mix of level 1 and level 2 incomes, along with their personal savings (eg, their house and their bank accounts and savings deposits) sufficient to meet their retirement income goals, in which case they allocate 100 per cent of their Managed DC accumulation to those two. However, members who reach retirement and have a goal of a higher income than they can get from levels 1 and 2, and who are willing to delay some of their consumption or have other income for a time but need to replace that other income after that time, may elect to take some risk to try to get to that desired goal and give up some income now in the hope of achieving that higher income goal from that targeted later date. To implement the level 3 income strategy, there is a direct correspondence to the current Managed DC process for improving the estimated probability of achieving the member's desired income goal in the accumulation phase, subject to the level 1 + level 2 income constraint. So the amounts invested to support level 3 will be in equity, and possibly fixed income as well, as the member gets nearer to the point where equity exposure is not needed any more to achieve his level 3 income goal. The same 'probability meter' that is used to guide the member during the accumulation phase may be used to keep them informed about their chances of achieving this level 3 target. Also, alerts can be sent out if the estimated probability falls below a preset level, as is done in the Managed DC plan in the accumulation period. If members want a

higher estimated probability of achieving their level 3 target, they can increase the investment horizon or lower either level 2 or 3 income levels.

As the member gets nearer to the point where equity exposure is no longer needed to achieve his level 3 target, level 3 assets will be moved away from equities into fixed income. Once the horizon has been reached, level 3 assets will be reallocated into the level 2 portfolio or move into level 1 to buy a life annuity and the higher payments will start. If the goal is not reached by the end of the horizon, the member is sent an alert to adjust his time horizon. If he does not do this, the level 3 assets will be moved to the level 2 portfolio and level 2 income will increase by whatever inflation-indexed income the level 3 assets can buy, or the assets will be used to buy a life annuity.

An integrated and seamless transition from accumulation to decumulation

As the post-retirement or decumulation phase looks a lot like the accumulation phase, this makes for a near seamless transition into retirement for the member.

	Accumulation	Decumulation
Choices	Conservative income	Level 1 + level 2 income
	Desired income	Level 3 desired income
	Member contribution	Not applicable
	Retirement age	Level 3 investment horizon

Dealing with non-engaged members

It is, unfortunately, a fact of life that members are generally not very engaged. This is very likely to be the rule rather than the exception for many members who are automatically enrolled during the accumulation phase. This obviously creates some challenges. In the accumulation phase, this is addressed by providing default desired and conservative income targets for each member. It is more probable that these members will become engaged by the time they retire, at least enough to provide some additional information and make some choices. Nevertheless, there must be a provision for default payout strategies for each member in retirement.

To the extent that feasibility and the law permits, I would propose to set the default level 1 income based on:

- a. the available academic research about the replacement rates that will be required for different salary levels to meet their basic needs in retirement
- b. the years of service from enrolment until retirement, or earlier termination, and other variables, including contributions and account balances.

The remainder of their assets will be elevated to level 2 income. Although not explicitly included at this time, the offering of a long-deferred life annuity contract would give us the possibility to include ‘tail-risk’ longevity insurance as part of this default level 2 income.

Just like the defaults provided in the Managed DC plan in the accumulation phase, the default payout structure should leave the possibility for further customisation fully intact.

Summary

The discussion above presents an income target oriented approach to DC both pre- and post-retirement. It is designed to achieve the following.

- It integrates income drawdown and annuitisation in a coherent fashion.
- Conceptually, it provides a seamless transition from accumulation to decumulation, by setting goals and defining risk in income terms, and providing very similar choices.
- It provides a customised solution for each member.
- It provides an integrated perspective on other sources of retirement income, such as state benefits, DB pensions and working after retirement.
- It provides a member experience in retirement that is very similar to the experience pre-retirement.
- By using a liability-driven investment (LDI) approach both pre- and post retirement, it reduces interest risk while reducing the need for annuitisation, and allowing the member to delay his payout decisions until very close to retirement, when he is best informed and motivated to make such decisions.

- Like Managed DC in the accumulation phase, it is intuitively simple, yet very different than other solutions.
- By using the same concepts and the same type of investment strategies both pre- and post-retirement, with the same type of underlying investment funds, it makes implementation easy and reduces operational risk.

Endnotes

¹ See Robert C. Merton, "The Future of Retirement Planning" in *The Future of Life-Cycle Saving & Investing* eds. Z. Bodie, D. McLeavey and L.B. Siegel, Research Foundation of the CFA Institute, 2007, and Robert C. Merton, "Observations on Financial Education and Consumer Financial Protection" in *Life-Cycle Investing: Financial Education and Consumer Protection*, eds. Z. Bodie, L. B. Siegel, and L. Stanton, Research Foundation of the CFA Institute, November 2012, Vol. 2012, No. 3.

² It might note a notional retirement income, but this typically is no more than a simple translation of account value into income by applying the annuity formula with assumed constant interest and longevity rates. It thus reflects neither the interest risk or longevity risks which distinguish the risk of income from the risk of wealth.

³ That is their current DC accumulation plus their projected future contributions.

⁴ Merton (2012).

⁵ Although not explicitly included at this time, the offering of a long-deferred life annuity contract that starts its payments at age 85 would give the participant another choice to buy "tail-risk" longevity insurance as part of his level 2 income.