The Road Less Traveled:
Minimizing Shortfall and Dynamically Allocating in DC Plans

James Sia

Two roads diverged in a wood, and I –
I took the one less traveled by,
And that has made all the difference.

Robert Frost,
“The Road Not Taken”

As Defined Contribution (DC) plans have taken center stage in many retirement systems throughout the world, so too have pre-packaged multi-asset solutions. Target Date Funds (TDFs), Life Cycle Funds, Managed Accounts, Advice, Target Risk, Life Style, and Diversified Growth Funds all provide some type of “one-stop shopping” for DC investors. In the U.S., TDFs have become the dominant solution, capturing overwhelming amounts of cash flows from plans that adopt them as their “Qualified Default.”

In an attempt to maximize return relative to risk, these products are typically anchored in Modern Portfolio Theory. At GMO, we believe DC retirement saving is a wealth challenge, not a return challenge. This may seem a subtle difference, but there are significant implications. We believe minimizing the likelihood of falling short of one’s wealth target (expected shortfall) is more relevant to the participant’s actual needs than maximizing return per unit of risk. Minimizing expected shortfall continually creates portfolios that focus on how much wealth is needed and when it is needed, based on the assets invested and time horizon to retirement. We believe this is a better objective for today’s DC plans.

TDFs put participants on a pre-determined asset allocation path (a “glide path”), which systematically decreases equity exposure as an investor approaches retirement. While this approach may be more effective than participants building their own portfolios, it relies on the assumption that expected returns are constant, ignoring current market valuations. While glide paths themselves appear smooth, a pre-determined asset mix often puts participants on a bumpy road that crosses every peak and valley the capital markets have to offer. At GMO, we believe this makes no sense. As the evolution of retirement plan investment design continues, we suggest a different approach – one that tries to minimize expected shortfall and incorporates asset valuation into the asset allocation process. This approach can be used as part of a process to transform a glide path “line” (or specific allocation policy) into a glide path “channel” (or range of allocations). Doing so can help a participant underweight expensive assets and overweight cheap assets, potentially delivering a smoother ride. Based on simulations and historical returns, our research shows that by adding a valuation-sensitive component, or a “dynamic lever,” to a glide path, the chance of a participant running out of money in retirement through the age of 95 can be dramatically reduced. It is a road less traveled, yet one where more participants are more likely to meet their retirement needs. And, given the central role of TDFs in today’s DC system, it is a crucial consideration to improve the likelihood of retirement success.

1 This paper is a summary of research done by Ben Inker and Martin Tarlie, presented in April 2014 in "Investing for Retirement: The Defined Contribution Challenge." This GMO white paper is available to registered users at www.gmo.com.
2 According to 2014 Towers Watson Global Pension Survey, the DC share of pension assets has grown from 38% to 47% in the last 10 years for 13 major pension markets ($32 trillion in total assets). DC grew at 8.8% vs. 5% for DB.
3 In 2006, Congress passed the Pension Protection Act (PPA), paving the way for automatic enrollment and requiring the naming of Qualified Default Investment Alternatives (QDIA). TDFs have become the overwhelming choice as QDIA. According to the ICI’s Research Perspective, Vol. 19, No. 12, December, 2013, 54% of account balances for recently hired workers in their 20s were in balanced funds, including TDFs, at year-end 2012, up from 7% in 1998. Forty-three percent were in TDFs.
4 See Footnote 1.
Evolution of U.S. Retirement

The U.S. retirement system is in the midst of a major transition from Defined Benefit (DB) to Defined Contribution (DC) programs. This is no secret: cover upon magazine cover and reams of paper have been dedicated to the topic for nearly 30 years. Two “once-in-a-lifetime” events in one decade – the bursting of the “Dot-com” bubble in 1999-2000 and the “Global Financial Crisis” of 2008 – have changed everything. If a DB plan were a car with the plan sponsor as driver, the legislative guard rails along the DB funding road were narrowed considerably in the Pension Protection Act of 2006 and in subsequent actions. The dramatic market events of the prior decade imposed tighter behavioral constraints at the same time. Sponsors accustomed to speeding down a wide open, multi-lane highway have been thrown onto a winding, single-lane country road where twists and turns, dictated by capital market returns, are often blind. Sponsors are now more immediately liable for writing big checks when capital markets don't deliver for them. The limited ability to smooth out DB plan results has turned the spotlight to DC plans: a defined funding/contribution commitment for sponsors, with less worry about managing long-term problems in the wake of the short-term vagaries of capital markets.

DC Plan Design Progress – TDFs Becoming the Primary Investment Architecture

Whether or not we like DC plans, they are here to stay. DC has become the workhorse of the U.S. retirement system. With more focus on plan design, they are now more likely to deliver success than in their early days as voluntary, supplemental savings plans. One significant flaw of the DC system before PPA when compared to DB design related to participant behavior. Even if participants did not take action, they succeeded in DB plans because the benefit automatically accrued. However, in DC, where the sponsor matches participant contributions, if participants didn’t act (sign up to save for retirement and make sound investment choices) they didn’t get any benefit. The PPA of 2006 paved the way for Automatic Enrollment and Automatic Escalation. It also mandated that the Department of Labor identify Qualified Default Investment Alternatives (QDIA) for participants that did not provide investment direction.

The identification of a QDIA with safe harbor protections was the bridge that connected participants to the “auto plan” design, allowing it to work. TDFs are the overwhelming choice for QDIA. These investments use a glide path asset allocation design to provide high exposure to equities for young workers and to systematically reduce that exposure in favor of fixed income as a participant approaches retirement. In the last decade, TDFs have helped reduce concentrations in any of a number of offerings (e.g., Stable Value, company stock, or U.S. Large Cap Growth mutual funds). TDF dominance in asset flows has naturally standardized portfolio structures in DC, taking most of the driving (asset allocation evolution through time, rebalancing, manager selection) out of the hands of participants.

The TDF trend is powerful. Indeed, if current cash flow activity continues, many plans will see the majority of their plan assets in TDFs within a few years. Some sponsors have accelerated this trend by “re-enrolling” their participant populations (moving all participant assets to a TDF with 90 days’ advance notice). With this concentration in one approach, the TDF structure has become the chassis of the entire DC system. Maximizing the efficacy of this investment structure is imperative because, just as is the case with DB, the majority of a participant’s benefit in retirement is determined by investment returns, not contributions. While TDFs offer certain advantages to plan participants, they come with some inherent flaws.

Challenges with Retirement Investment Thinking Today

Just as is true with DB, the DC challenge (and opportunity!) is the long horizon: DC is a 70-year problem, including 40 years of saving and 30 years of spending. Unfortunately, TDFs today rely primarily on flawed logic that matches neither return history nor future capital market expectations. To gain a sense of why that’s the case we need to mention a four letter word – with apologies in advance – math.

We all know that lower expenses are better than higher expenses for the same service provided and saving more is better than saving less. However, math isn’t always that obvious. For example, two people with the same savings experience (number of years saving, amount saved, and average annual return) can have different results! Sometimes, in fact quite often, the year you are born has a big impact on your chance of retirement savings success. Why? Sequence of return risk.

Sequence of return risk relates to the difference between investing a lump sum and a series of contributions (such as in a DC plan). If you invest one lump sum at the age of 25, the order of returns you receive doesn't matter. You could have high returns early and

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5 According to Vanguard’s “How America Saves 2013,” 84% of their clients’ plans offered TDFs in 2012, up from 45% in 2007. Of their clients’ plans that auto enroll, 90% have TDFs as QDIA.

6 According to the ICI’s Research Perspective, Vol. 19, No. 12, December, 2013, only 8.4% of newly hired participants had more than 50% of their accounts invested in company stock, down from almost 24% in 1991.
low returns close to retirement, or experience exactly the opposite, and it won't matter. However, if you invest 40 contributions over 40 years like a DC investor, the order of returns matters a lot. High returns early in your savings career only help a little because your total savings is small. High returns later in your savings career, when you’ve made 25 or 30 years of contributions, can really have a big impact on your total wealth when you retire. Conversely, negative returns late in your savings career can be crippling to retirement savings success. Unfortunately, TDFs that rely on Modern Portfolio Theory build portfolios with the assumption that expected returns are constant because they can’t be predicted, even though research suggests otherwise.

Investment managers frequently cite the period from 1926 to today and suggest the return from stocks was roughly 6% a year in real terms (after inflation). However, if you invested in January of 1929 or January of 2000, your returns were not 6% after inflation. Why? Valuations. You started investing when the stock market was very expensive. Expensive markets have tended historically to deliver below average returns and cheap markets have tended historically to deliver above average returns. Fairly valued, or average markets, have tended historically to deliver average returns. Returns historically have been dependent on starting valuations (the price at which you buy) and ending valuations (the price at which you sell). Exhibit 1 shows the average subsequent 10-year real return of the equity market, segmented into valuation quintiles. So, for example, the most expensive 20% of equity markets have, historically, delivered about 1.3% real – a far cry from the 6% average over the complete time period.

Exhibit 1

Average Subsequent 10-Year Real Return of the Equity Market

The level of returns in a retirement plan is a key input to retirement success, second only to savings, because if one doesn’t save sufficiently, returns won’t matter. And, asset allocation is the most dominant influence on a portfolio’s investment returns. These allocation percentages are active decisions, even for a passive TDF, and they really matter in achieving retirement success. A very simple equation for retirement success is:

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\text{Retirement Success} = \text{Savings While Working} + \text{Investment Returns After Inflation} - \text{Spending While Retired}
\]

The most important takeaway from this discussion is that, all else equal, a solution that delivers better returns after inflation improves retirement success.

Most TDFs put a lot of research into designing well-diversified asset allocation schemes that slowly reduce equity exposures through time. One major flaw with this approach is that it typically does not meaningfully adjust allocations based on current market conditions and valuations. The allocation is pre-determined based on long-term assumptions that, while accurate compared to longer-term averages, don’t incorporate the often obvious realities reflected in valuations today. In 2008, TDFs with a 2010 horizon lost an average of 23% because equity markets were very expensive and 2010 TDFs owned them anyway. Anyone retiring around that time faced serious headwinds in meeting their spending needs with dramatically reduced portfolios.

8 The 1986 Brinson, Hood, and Beebower study on the contribution of asset allocation has been misrepresented as being about level of returns, rather than variability of returns. However, Jahnke, Ibbotson, et al., and Idzorek attribute 100% of a portfolio’s level of returns to asset allocation policy.
9 Morningstar.
Another flaw with many of today’s TDFs is that they commonly use methods to maximize average annual return. While that may sound logical, it doesn’t necessarily lead to the best outcome participants care about – their wealth. The chart to the left in Exhibit 2 shows the possible average annual return outcomes from a 5% return with 16% volatility after 40 years. (Volatility is average variability of a return, so, while 5% is the average return, there can be years of worse and better returns. The average variability of the return result is the volatility.) The horizontal axis measures return and the vertical axis measures the likelihood of achieving a particular return. The most likely average annual return, over 40 years, is the highest point on the curved, bell-shaped line. The possible return outcomes are “normally” distributed in that the left and the right sides of the peak are mirror images of each other. And, the average and the most likely average annual return outcomes are the same, but neither one is something participants or plan sponsors should care about.

Retirement is a wealth problem. Wealth builds (or recedes) over time and the laws of compounding play an important role. Compound wealth represents the cumulative effect of a series of gains or losses over a period of time. The chart to the right in Exhibit 2 applies the returns on the left to grow $1 for 40 years, with the graphed line representing possible ending wealth outcomes. The resulting wealth curve is not “normal” or symmetrically balanced like the return curve. It is skewed to the left. The most likely outcome at the highest point on the curved line, $3, is not the same as the average outcome, $12. That is because growing $1 involves compounding. And, a negative return compounds less favorably than the same positive return when applied to money. A -20% return on your money ($1 becomes 80 cents) requires a 25% return (80 cents plus 25% of 80 cents, or 20 cents, gets you back to a dollar) to get back to $1. A positive 20% return ($1 grows to $1.20) requires only a -16.7% return ($1.20 minus 16.7% of $1.20 gets you back to a dollar) to get back to $1. The possible wealth results are skewed to the left. The average wealth result and the most likely wealth result are not the same. Retirement is a wealth problem and it is very important to focus on the most likely wealth outcomes, not the average return and average wealth outcomes.

An Improved Approach to TDF Design – Minimizing Shortfall and Allocating Dynamically

With the “math” out of the way, what's the best approach to retirement investing? From our perspective, we suggest DC plan sponsors and investment managers focus on minimizing expected shortfall for the most participants and use a dynamic allocation that incorporates valuation.

Minimizing expected shortfall is an approach that focuses on how much money is needed and when it is needed. The goal isn’t to build the most wealth, but to avoid falling short of a wealth target at and in retirement. Falling short makes it more likely that a participant will run out of money. How would a strategy that tries to minimize shortfall of wealth differ from one that tries to maximize return per unit of risk? One way would be in the definition of risk. Strategies that try to maximize return often view risk as the potential for a return that is different from the expected average. Volatility (or the standard deviation) of returns has become the accepted measure of risk. Strategies that try to minimize wealth shortfall view risk as the chance of not having enough money. Another difference is in how they deal with investor risk tolerances. What should a conservative 40-year-old, with the same financial means (income, savings rate, account balance, debts, etc.) do differently from an aggressive 40-year-old? For a solution focused on return, the conservative saver would be put into a portfolio with a lower weight to stocks. While that might make the portfolio less volatile, it actually could increase the likelihood of shortfall. For a wealth-focused strategy, advice about how to become more conservative would be to save more, work longer, and/or expect to spend less in retirement.
So, how does a plan sponsor maximize the ability of capital markets to deliver the best wealth? A good start is to adopt TDFs, which have been shown to lower the behavioral risk of participants doing the wrong thing at the wrong time. DC participants rarely trade, and participants in TDFs trade even less than traditional DC investors. TDFs have proven to be an asset pool that rarely sells, but consistently buys (payroll contributions) and has a long-term horizon of roughly 70 years.

Once the assets in DC plans are in the common asset allocation architecture of a glide path, GMO’s second recommendation is to change from the “pre-set” allocation approach to a flexible one that considers current asset valuations. We know the stock market, based on history, has exhibited cyclical behavior, rising above and falling below long-term valuation averages (see Exhibit 3). And therein lies the challenge. TDFs tend to ignore this. A TDF that was, for example, 20 years from retirement in 1929, 1965, 2000, or 2008 (historically very expensive markets) would have had the same allocation as one 20 years from retirement in 1920, 1933, and 1980 (historically very inexpensive markets).

Exhibit 3
U.S. Stock Market Results, 1881-2011

Source: Robert Shiller (see Endnote 1); GMO Analysis

GMO’s research, illustrated in Exhibit 4, shows an inconsequential relationship between current value and future return of equities in the short term (1 to 5 years) but a very meaningful one over the medium and longer term (7 to 10 years).

Exhibit 4
Historical Correlation of Valuation and Subsequent U.S. Stock Market Returns

Source: Robert Shiller (see Endnote 2); GMO Analysis

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10 ICI Research Report: Defined Contribution Plan Participants’ Activities, 2013 surveyed 24 million participants representing $1.5 trillion of assets and found 10.7% changed asset allocation of balances while 7.4% changed asset allocation of contributions. The Hewitt 401(k) index measured 2.7% of participants’ balances moved between funds on a net basis in 2013. According to Vanguard’s “How America Saves,” 2013, 12% of participants made a trade in 2012, while only 2% of participants invested in a single TDF made a trade in that same year.

11 www.econ.yale.edu/~shiller/data.htm Prof. Robert Shiller of Yale University won a Nobel Prize for his research on normalized stock market valuations. Prof. Shiller created a cyclically adjusted price to earnings ratio using 10 years of data (versus popular analysis of a single year) and adjusting for inflation.
When faced with a long-term problem (the 70-year horizon of DC retirement investing) and a population of stable investors (DC investors generally and DC/TDF investors even more so), the strong historical relationship between valuation and subsequent returns over 7 to 10 years should be considered a valuable input. This type of input has the potential to add value when a glide path (the equity/fixed income ratio within a TDF) is transformed from a single line into a channel or path – one that allows the TDF to vary asset allocation exposure based on time horizon until retirement and current asset valuations (see Exhibit 5).

Exhibit 5
Incorporating Dynamic Asset Allocation into a Glide Path – Turning a Line into a Channel

Conclusion

The broad adoption of TDFs provides numerous benefits to plan participants, including a default investment that offers a “hands-off” approach to asset allocation. Given the central role of TDF glide paths as the primary chassis of investment design in DC, plan sponsors, consultants, and investment managers should address the major shortcomings embedded in most TDFs: they typically solve the wrong problem, trying to maximize return, and generally ignore asset class valuations. GMO proposes that TDF glide path designs strive to minimize expected shortfall for the most participants and incorporate a channel or range of allocations around a target glide path. The actual allocations should be informed by asset class valuations with an eye on the long horizon of retirement savings to capitalize on the long-term relationship between current valuations and expected future returns. This allows the TDF to take advantage of valuable information to improve outcomes, smooth out the ride, and potentially decrease sequence of return risks.

Plan sponsors and consultants are spending less time in committee meetings thinking about the inputs to DC plans (like what options should be on the core investment menu), and are devoting more time to what retirement success looks like and how many participants can realistically achieve that success.

With such a standard DC program, there is an opportunity to improve outcomes for millions of participants by improving the most important element of a TDF – its asset allocation. By aligning the design horizon with the length of time of the DC investment problem and the data showing the infrequency of participant trading, the benefit of asset class valuation can be used to advantage. While dynamic asset allocation is a road less traveled today, it should be the investment superhighway of tomorrow.
Endnotes

1. Data used in Exhibit 3 are from Robert Shiller’s website (http://www.econ.yale.edu/~shiller/data.htm). After 1926, the indexes are the S&P 500 and predecessors. Prior to 1926 the data are from Cowles and associates. Monthly dividend and earnings data are computed from the S&P four-quarter totals for the quarter since 1926. Dividend and earnings data before 1926 are from Cowles and associates (Common Stock Indexes, 2nd ed. [Bloomington, Ind.: Principia Press, 1939]).

2. Data used in Exhibit 4 are from Robert Shiller’s website (http://www.econ.yale.edu/~shiller/data.htm). After 1926, the indexes are the S&P 500 and predecessors. Prior to 1926 the data are from Cowles and associates. Monthly dividend and earnings data are computed from the S&P four-quarter totals for the quarter since 1926. Dividend and earnings data before 1926 are from Cowles and associates (Common Stock Indexes, 2nd ed. [Bloomington, Ind.: Principia Press, 1939]). Analysis of this data is provided by GMO.

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