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BUILDING BETTER DEFINED CONTRIBUTION PLANS AND THE NEED FOR A QUANTITATIVE EVALUATION FRAMEWORK

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It has become increasingly clear that defined contribution plans need to do more than simply offer participants a menu of investment choices—the average worker is not building a secure retirement. Because both employers and employees face constraints, the solution is not as straightforward as delaying retirement or boosting contributions. Features like automatic enrollment can help somewhat, but are not enough. Truly innovative solutions are needed.

There are numerous different proposals for improved retirement plans, both in the United States and internationally. The 2010 Society of Actuaries *Retirement 20/20* initiative generated 18 submissions; the *RetirementUSA* website contains 21 full or partial proposals; and the U.K. government-sponsored *Defined Ambition* project offers an example of what other countries are doing. Individual proposals often contain an evaluation section dealing with benefits and risks, but what is lacking is a full quantitative evaluation framework that can be uniformly applied to a number of different proposals. The *Retirement 20/20* project developed a qualitative Measurement Framework to evaluate plans, but a companion quantitative framework is needed.

In this essay, I'll lay the groundwork for a potential research project to build such a quantitative assessment framework. I'll first discuss some of the issues involved, and get more specific by examining two proposals—one advocating investment return guarantees and another proposing special structuring to mitigate investment risks. I'll be focusing on the accumulation phase in DC plans, but a logical extension would be a similar approach for the retirement phase.

THE BASIC CHALLENGE FOR DC PLANS

For DC plans to meet the needs of participants, they must: (1) produce adequate average retirement accumulations, and (2) minimize shortfalls. A quantitative evaluation framework should focus on these two objectives.

I'll begin the discussion of issues with an example of a straightforward DC plan with no special features and show how it does in meeting these two objectives. The example is based on historical average investment returns and an average level of contributions for U.S. plan participants.[1] The basic performance measure I use is the replacement ratio, where I divide the income that could be generated by purchasing an inflation-adjusted annuity at retirement by income immediately before retirement. Replacement ratios, although not very useful for individual financial planning, provide an informative measure for overall evaluations of retirement plans.

Chart 1
DC Replacement Ratios Based on Historical Investment Returns

Asset Allocation	Average Annual Return	Median Replacement Ratio	10th Percentile Replacement Ratio
100% Bonds	4.50%	21%	16%
25% Stocks, 75% Bonds	6.08%	28%	20%
50% Stocks, 50% Bonds	7.65%	35%	21%
75% Stocks, 25% Bonds	9.23%	42%	21%
100% Stocks	10.80%	52%	22%

This chart highlights the basic challenge that DC plans face. If we assume that Social Security replaces about 40% of pre-retirement income, and aim for an overall replacement ratio of 75% (commonly used in retirement adequacy analysis), it appears that today's median contribution rate is reasonably adequate as long as there is at least a 50% allocation to stocks. However, producing satisfactory results on average is not good enough for individual participants. The rightmost column indicates the need for significantly higher contributions to be 90% sure of achieving retirement adequacy. Unlike the median column, allocating more to stocks does not improve results. For example, with a 50/50 stock/bond allocation, the 9.6% contribution would need to rise to 13.4% (9.6% x 35/25) to be 90% sure of reaching the overall 75% target.

So there are reasons to be concerned, and it turns out that, if we take a closer look at assumptions, there may be even more cause for concern. We need to pay special attention to investment returns and the replacement ratio.

INVESTMENT ASSUMPTIONS

Using historical investment returns may provide credibility to an analysis, but there are well-supported arguments that we are likely to see lower returns for both stocks and bonds in the future. . However, the problem with attempting to use lower return assumptions is deciding which particular assumptions to choose. With regard to stock returns, the most credible source I have found involved a panel of notable economists and investment experts assembled by the CFA Institute in 2011 to predict returns over the next 10 years. Compared to the 11.8% historical stock return I used for Chart 1, this group of experts produced predictions ranging from roughly 7% to 11%, with the consensus toward the upper end of the range.

As for bonds, the past 30 years has seen bonds produce significant capital gains that have boosted returns. Over the longer history since 1926, the average return used in Chart 1 was 5.5% compared to today's current yield of about 2% for 10-year Treasuries. If real yields (after inflation) go back up to the historical average of about 2% (from today's zero or less as measured by TIPS rates), and we add an inflation premium of 2.3% based on the current Treasury/TIPS spread, that gets us only to 4.3%. For evaluating proposed retirement plans, it would seem prudent to use lower-than-historical returns for both stock and bonds. And given the uncertainty, it would also make sense to run additional sensitivity tests with a further lowering of returns.

I prepared this chart to show the impact of modestly lower returns (10.3% for stocks and 4.3% for bonds). The impact on both medians and 10th percentiles is significant. A more pessimistic scenario would have an even greater impact.

Chart 2
DC Replacement Ratios based on Lower Returns

Asset Allocation	Average Annual Return	Median Replacement Ratio	10th Percentile Replacement Ratio
100% Bonds	3.30%	18%	14%
25% Stocks, 75% Bonds	4.80%	24%	17%
50% Stocks, 50% Bonds	6.30%	30%	18%
75% Stocks, 25% Bonds	7.80%	37%	18%
100% Stocks	9.30%	40%	16%

REPLACEMENT RATIOS

The replacement ratio is a popular measure used to evaluate DB plans and, more recently has been applied to DC plans. It can be a useful measure for evaluating and comparing different retirement plans (and plan

proposals), both in terms of expected performance and risk.

The recurring Aon/Georgia State Replacement Ratio studies have served as a standard for pension actuaries in estimating the average replacement ratio needed to maintain pre-retirement living standards after retirement. A 75% replacement ratio has been a commonly used benchmark based on these studies. However, a 2012 study from Aon Hewitt entitled "The Real Deal" uses updated assumptions for investment returns, longevity, and medical costs, and increases the required average replacement ratio to 85%.

The replacement ratio from Social Security also figures into the analysis. Based on the Trustees Report, the current average Social Security replacement ratio for a 65-year-old is about 41%, but will gradually drop to about 36% as the effect of increasing the full retirement age to 67 phases in. Of course, any future reductions in benefits to shore up Social Security's finances will likely further lower the ratio.

In terms of establishing a framework for evaluating proposed plans, these investment return and replacement ratio considerations definitely point to increased challenges ahead. I'll now examine two specific proposals for reducing risk in DC plans, while keeping these challenges in mind. This will provide more specifics about things to take into account in building an evaluation framework.

GUARANTEES

One way to reduce the variability of retirement outcomes is by providing guarantees. Professor Teresa Ghilarducci of the New School for Social Research has been a strong advocate for guarantees, as described in her 2008 book, *When I'm Sixty-Four*. She proposed replacing 401(k)s with Guaranteed Retirement Accounts (GRAs) offering Federally guaranteed real returns of at least 3%.

This chart shows the effect on replacement rates of various levels of real rate guarantees. Compared to Chart 2, we can see that even a 1% real rate guarantee would improve 10th percentile outcomes. However, it would require a more aggressive guarantee than Professor Ghilarducci's proposed 3% to get close to providing full assurance of retirement adequacy.

Chart 3
Effect of Guarantees

Real Rate Guarantee	Resulting Replacement Ratio
0%	16%
1%	19%
2%	22%
3%	26%
4%	33%
5%	40%

To evaluate the feasibility of offering guarantees, we need to consider affordability, and this was the subject of a 2009 study by the Center for Retirement Research at Boston College (CRR) entitled, "What Does it Cost to Guarantee Returns?" They examined affordability both retrospectively using historical return data and prospectively based on financial market options pricing. These two approaches led to strikingly different conclusions. The historical view showed that guarantees as high as 3% real for DC savings over a hypothetical full working career would not have required any support payments from the government guarantor. They also showed that guarantees locking in 6% (with any overages kept by the government) would have made money for the government. So both results were good news for guarantee advocates.

However, when they applied financial market options theory and took a prospective view, they came to the conclusion that, unless the government is willing to bear more risk than the private market, it would not be feasible to offer any guarantee greater than the real risk free rate—about 2 percent historically and close to zero currently. In effect, any guarantee greater than the risk free rate would involve taxpayers providing retirement savers with a financial put option and not being paid for it. The CRR study did, however, leave open the question of whether the government might be better positioned to bear risk than the private market, which could be used to argue in favor of government guarantees greater than the risk free rate.

As part of building an overall framework for evaluating retirement plan proposals, it would be worthwhile to further examine the CRR analysis on guarantees. In particular, it would be worth examining the practical effects. For example, an economic theory argument against offering guarantees above the risk free rate is that such guarantees would create an arbitrage opportunity, which certain market participants could play to their advantage. It might therefore be necessary to limit allocations to stocks and other equity-like asset classes. But with such restrictions in place, guarantees might end up serving the useful purpose of encouraging plan participants to save more than they would otherwise—turning a theoretical problem into a positive practical benefit.

SPECIAL STRUCTURING

A completely different approach than using guarantees to shore up the performance of DC plans would involve building more structure into the plans than simply offering participants a bunch of different investment choices. One such structural approach that has gained a lot of popularity is the use of target-date funds that reduce stock allocations as a function of participant age, thus lowering volatility as the participant gets closer to retirement. However, just offering target-date funds does not sufficiently reduce investment risk as was demonstrated in the article by Bodie, et al. listed in the references—so more is needed.

An example of a structural approach that attempts to do more by adding other features to a target-date structure is "The Tracker Plan" developed by actuary Rowland Davis for his *Retirement 20/20* proposal. Besides offering a well-thought-out plan, he provides an evaluation of his plan that could serve as a template in developing a generalized evaluation framework.

The Tracker Plan adds the following structural elements to further improve plan performance:

- Operating rules to shift to more conservative allocations when investments perform better than expected
- Operating rules calling for additional plan sponsor contributions when performance falls below tracking targets
- A safety valve of participants delaying retirement by as much as a year under the poorest performing investment scenarios
- Total contributions from plan sponsors and participants at a significantly higher level than today's DC plan averages
- Costs of investment management and plan administration held down to miniscule levels.

The Tracker Plan calls for employee contributions of 4% in the early years grading up to 8% by age 33 with a 100% employer match. That's 16% total for most of the working years and consistent with others like EBRI and Aon Hewitt who argue for total contributions of at least 15%. No one is contending that today's average of around 10% will get the job done.

Davis provides a detailed demonstration showing that his multifaceted approach will meet the retirement adequacy objectives, while keeping risk at reasonable levels. However, this proposal was developed more than three years ago and used historical investment returns and a minimum target of a 75% replacement ratio, so it would likely need to be adjusted to adapt to more challenging assumptions. But what is perhaps the most useful aspect of The Tracker Plan is the way Davis provides a full evaluation in terms of replacement ratios. In particular, Davis provides a demonstration that starts with a standard DC plan and shows how adding each separate element of the Tracker Plan narrows the range of outcomes.

CONCLUSION

This essay has provided an overview of the types of considerations that will need to go into the development of a comprehensive quantitative framework for evaluating retirement plan proposals. The Tracker Plan can provide a template for developing the evaluation framework, but investment return assumptions, replacement ratio targets, and the affordability of any guarantees will all need special attention. . Given the crucial need to build better DC retirement plans, it will be most useful to have better quantitative assessment tools that can be applied to existing proposals and, more importantly, to new ones as they come along. Actuaries are uniquely equipped to play the lead role in carrying this development effort forward.

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ENDNOTES

[1] The specific assumptions used were that the individual works 35 years with annual increases of 3.3% for inflation plus promotion, and retires at age 65. I assumed combined employer and employee contributions of 9.6% of pay, which is the median for participants reported in Vanguard's 2012 *How America Saves* report. For investment returns, I used *Ibbotson®* averages going back to 1926—11.8% for large-company stocks and 5.5% for intermediate-term government bonds. I deducted 1.00% for total plan costs, which is the approximate average for large plans in 2012 reported in the *401k Averages Book*. Savings balances at retirement were converted into income using a payout rate for an inflation-adjusted immediate annuity of 5.75%, which I priced to be consistent with the bond return assumption. Monte Carlo simulations were used to generate the outcomes.