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## **Smoother Income, with 'iTDFs'**

By Per U. K. Linnemann    *Thu, Sep 7, 2017*

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*Our guest columnist, a former chief actuary of Denmark, adds new details about his design for a target date fund on how to smooth income - and stay fully invested - in retirement.*

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Today's retirement income planning software can't easily answer questions like, "How much do markets have to decline before I should cut spending in retirement?" or "How much should I reduce my spending in order to get back on track?" For the millions of retirees who feel anxious about market volatility, that's a significant shortcoming.

My startup company in Denmark, Linnemann Actuarial Consulting ApS, has created algorithms to fill this vacuum. We can provide a smoother retirement income journey, in which withdrawal rates and portfolio asset allocations change automatically in response to investment market developments. This allows individuals and their advisors to co-ordinate their investment, distribution and longevity protection strategies.

The products based on our method, which we call iTDFs, are hybrids between target date funds (using glidepaths that reduce equity exposure over time) and smoothed income annuities. A life insurance company doesn't need to be involved. It requires no expensive guarantees or potentially costly derivatives.

### **The old variable payment and variable-period payment strategies**

Let's consider a few of the problems with traditional variable payment strategies (where payments fluctuate with the markets) and variable-period payment strategies (where the length of the payment stream varies).

First, it can be dangerous to withdraw a specific percentage from your portfolio from year to year (e.g., by using the annuitization method, where the distribution amount is determined by dividing the investment account balance by an annuity factor). Market volatility will cause your income to vary too much from year to year.

Second, if you practice the famous "4% withdrawal rule" (by spending an amount equal to 4% of your savings adjusted upward each year for inflation), you'll find that it lacks capital efficiency. You could either spend too much, and run out of money too soon, or not spend enough, and deprive yourself of many of the pleasures of retirement.

There's a better way. As [Jaconetti et al \(2013\)](#) at Vanguard have pointed out: "If a portfolio is to rely on the capital markets for growth, then investors must either accept continuous, relatively smaller changes in

spending or else run the risk of having to make abrupt and significantly larger adjustments later." That's what we're proposing: "Continuous, relatively smaller changes in spending."

### **A new approach to investing and spending in retirement**

Retirees need to embrace two concepts. The first is income "smoothing." Incomes should be fairly predictable from year to year. In addition, they need to moderate their investment risk as they age. If there's a sharp downturn in the financial markets, they may not have time to ride out a downturn or return to work and add to their savings.

Enter the iTDFs, which combines smoothing with the "glidepath" of TDFs. Investors can use iTDFs to accumulate wealth before retirement and to generate smoother income during retirement, either for a pre-defined period or for as long as they live. The iTDF framework can also be structured to provide a "smoothed" lump sum payment at retirement.

iTDFs give each investor a dynamically self-adjusting glidepath with automatic re-balancing and re-allocation of assets. Metaphorically speaking, we added intelligent shock absorbers and an automatic transmission to existing TDFs. (This concept was described in my article, "[iTDFs: 'Self-Driving' Retirement Cars](#)," published in *Retirement Income Journal* on April 19, 2017.

iTDFs use innovative algorithms that smooth payouts by adjusting to fluctuations in portfolio value. It works in a capital-efficient way: the product doesn't require an inefficient "buffer" (assets held in a side account to store gains or compensate for shortfalls) and the manufacturer assumes no investment risk.

Although the investment account value may fluctuate significantly in the short term, the formulas dynamically determine an income that won't fluctuate with market conditions. The formulas also mitigate the risk of sudden market swings close to the retirement date might have on the beginning income.

Relying on a robust formula-driven framework, iTDFs will fit easily into an increasingly digitalized and mass-customized world. Different versions of iTDFs can be tailored to market conditions and purposes in the U.S., Europe, Australia and Asia.

### **How iTDFs work**

iTDFs are an innovative savings and retirement concept based on principles that are both simple and robust. Though compatible with Modern Portfolio Theory (MPT) and managed volatility control on the sub-portfolio level, they don't rely on any capital market model—for example, the (multidimensional) log-normal probability distribution.

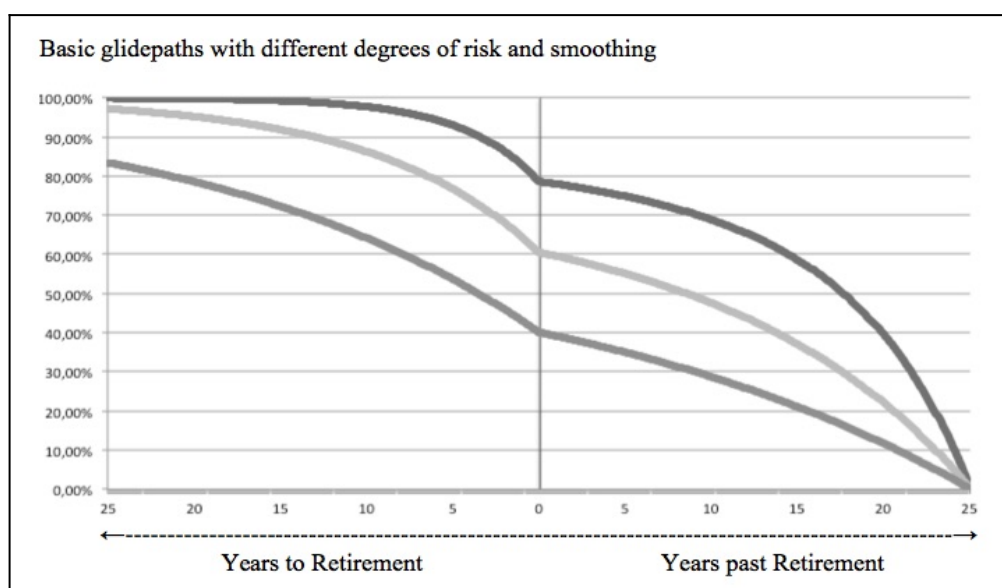
In our iTDF products, the full market-linked return is passed on to the investment account of the individual investor during both the accumulation and decumulation periods. The savings in the investment account are allocated between a risky investment fund and a riskless investment fund.

Three factors determine the allocation and re-balancing between the two diversified funds: The client's risk

appetite or capacity, the length of time until the target retirement date (and, subsequently, until the portfolio consists entirely of riskless investments) and the smoothing mechanism.

In the chart below, the y axis represents the percent of the portfolio allocated to risky assets. The x axis indicates the number of years before and after the retirement date. As in so-called “through” TDFs, the shift to an all-riskless asset portfolio occurs long after retirement, not at the retirement date (as in “to” TDFs). As in any TDF, the allocation to risky assets declines gradually with age.

The three lines represent three different “neutral” asset allocations. The allocation is considered neutral when the market value of the assets in the combined risky and riskless investment accounts equals the present value of future liabilities (i.e., the client’s income over the course of retirement).



Enter the smoothing mechanism. When the value of the assets exceeds the present value of the liabilities, there is room for taking on some more risk and for increasing the proportion of the risky investment fund above the neutral allocation. When the value of the assets is less than the present value of the liabilities, the algorithm increases the allocation to riskless assets.

Over time, the allocation between the risky investment fund and the riskless investment fund fluctuates around the neutral glide path according to our dynamic self-adjusting asset allocation and rebalancing method. It varies according to market fluctuations, the degree of smoothing, and the relation between the value of the assets and the value of the liabilities.

Both the assets and the liabilities shrink as the client draws income during retirement. During retirement, the smoothing mechanism helps to stabilize the income stream. The secret sauce of our proprietary approach is making all the moving parts work well together.

Significantly, our iTDF design can accommodate the creation of a family of products with a range of risky assets, various levels of investment risk and different degrees of smoothing. For those who want

guaranteed income in the later part of life, we can combine iTDFs with deferred or immediate income annuities.

*Appointed Chief Actuary in the Civil Service of the Danish Insurance Supervisory Authority by Her Majesty Queen Margrethe 2nd of Denmark when he was 30, Linnemann has more than 30 years of experience in the life and pension industry. He holds Ph.D. and M.Sc. degrees in actuarial science from the University of Copenhagen.*

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