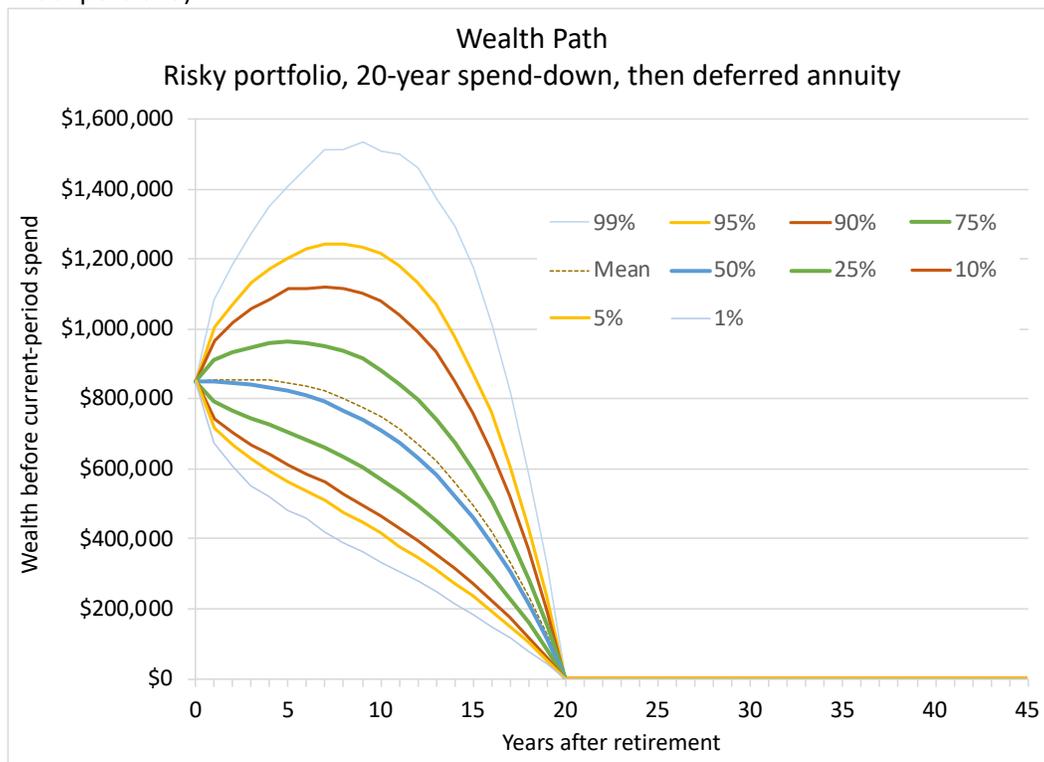


hope of a rebound. Without the guarantee, the investor would be strongly motivated to cut his or her losses and lock in a lower rate of consumption by adopting a riskless or much less risky posture – a costly decision if markets rebound after a decline.

Exhibit 2 shows the wealth path that corresponds to each of the market percentile results in Exhibit 1. By design, the investor’s DC plan is depleted by the 20th year and has only the DA payout to live on. (The present value of expected DA payments is not shown as investor wealth.) To save space, the wealth path is not shown in our spending simulations using lower-risk strategies, shown later.

Exhibit 2
Wealth path, base case (20-year DC spend-down, then deferred annuity purchased with 15% of initial portfolio)



Source: Constructed by the authors using Excel™ SIPmath™ add-in.

Note: Same as Exhibit 1.

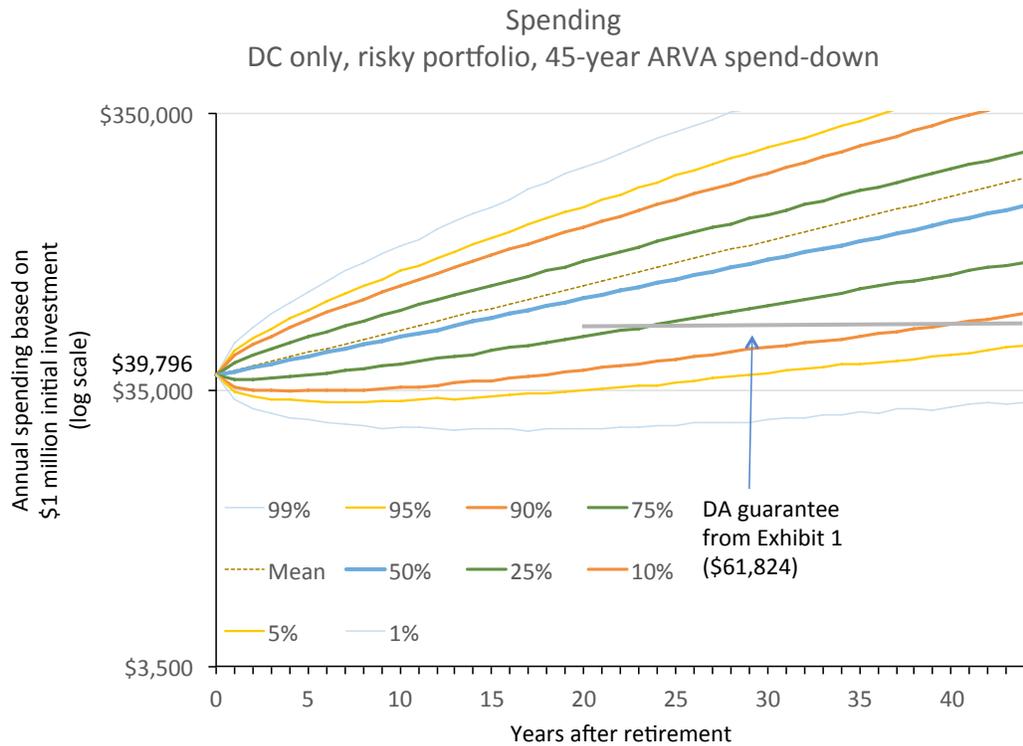
Comparison with comparable-risk DC-only strategy

To show graphically how the usefulness of the blended strategy dominates that of either all-DC or all-DA, we next simulate those and discuss the differences. We also simulate a blended strategy using a mostly fixed-income asset mix since that is what some investors do (and is Sexauer *et al.*'s [2012, 2013] base case) – but note that the backstop of a substantial lifetime income guarantee enables investors to take more risk in the DC portfolio than they otherwise might.

Exhibit 3 shows the spending path for a DC-only strategy with a 45-year ARVA spend-down. While planning for 45 years after retirement may seem extreme, an investor having no lifetime income guarantee has to do this to avoid running out of money before age 110, should she live that long.

Initial spending is lower than in Exhibit 1 because spending is spread over 45 years rather than 20, but this lowering is partially compensated having invested the full \$1 million of savings in the markets (instead of using \$150,000 of it to buy a DA). The light gray horizontal line is the DA guarantee from Exhibit 1, shown for comparison. Note that spending in the later years (after the 20th year, age 85) is below the DA guarantee at the 1st, 5th, 10th, and to some extent the 25th percentile of market performance.

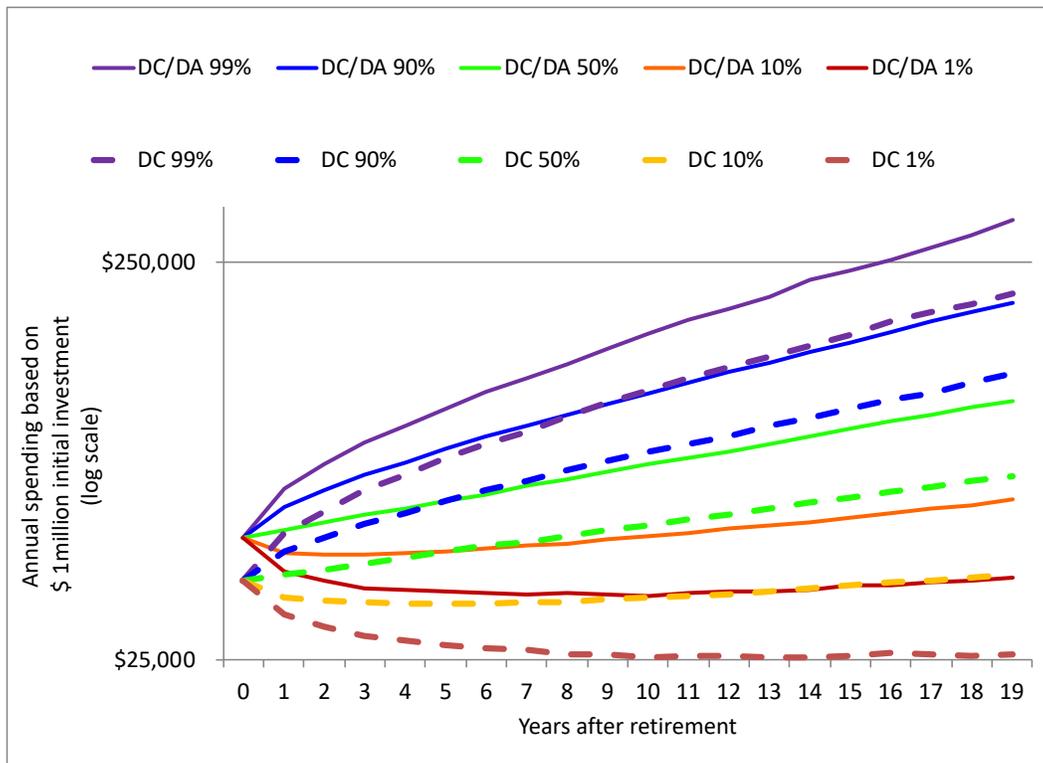
Exhibit 3
Annual spending, DC only, risky portfolio, \$1 million initial balance, 45-year ARVA spend-down



Source: Data used to construct Exhibits 1 and 3

The eye cannot easily compare curves from two diagrams drawn to different scales and on separate pages. Thus, to compare results from the DC/DA strategy with those of the DC-only strategy, we present Exhibit 4, which focuses on just the first 20 years, uses the same scale, and shows only a few of the percentiles of market performance.

Exhibit 4
Comparison of DC/DA spending with DC-only spending, first 20 years, risky markets



Source: Data used to construct exhibits 1 and 3

We used a rainbow design to make this fairly complex graph easier to read. The first percentile of both distributions is in red, with the distribution for the DC/DA strategy shown with a solid line and that for the DC-only strategy shown with a dashed line. This pattern is repeated for the 10th percentile (orange), 50th (green), 90th (blue), and 99th (violet).

The blended or DC/DA strategy dominates (provides higher spending than) the DC-only strategy at *all five percentiles* of market performance for *all 20 years*. The DC-only strategy has a wider distribution (because more money – \$1 million instead of \$850,000 – is invested in the same risky assets), so the best-case scenarios for DC-only must eventually exceed the corresponding ones for DC/DA, *but not in the first 20 years*, and beyond 20 years we’ve substituted DA payouts for continued exposure to risk in the markets.

Moreover, the first 20 years are the ones when most investors care about maximizing spending (as opposed to merely avoiding ruin). They are also the years in which the investor is likely to be alive!

But what if you live beyond 85? DC/DA will not always dominate numerically, especially because we have capped (and floored) the payout by substituting a DA payout for a market payout after age 85. The DA payout is tiny compared to some of the best-case-scenario payouts from the DC-only strategy as shown in Exhibit 3. However, DC/DA improves utility not just by providing higher payout after age 85 in some states of the world, but by allowing investors to *forget about their investments* after age 85 in all states of the world.

This last point deserves extra emphasis. Forgetting about investment policy, strategy, trading, costs, and fluctuations – and just living on a fixed income – is a goal eagerly sought by many older retirees. Those who want to continue to participate in market risk can easily do so, a topic to which we turn later in the section called “The Ant Strategy.”

*Solving the cat food problem.*⁷ There is yet another benefit to having a guaranteed lifetime income component. Some retirees are afraid to spend very much out of their portfolios because of the fear of destitution in very old age, and consequently live at a standard well below what they can afford. This is a very inefficient way of “buying” longevity insurance. The retiree will have a much more comfortable and worry-free existence just purchasing it the insurance outright through a DA or having had an employer provide it through a late-in-life DB plan.

Comparison with low-risk strategies

The other approaches to which compare our basic strategy are: (1) DB only, and (2) the blended DC-DA strategy but with low-risk investments in the DC plan.

1. *DB only.* “DB only” is very simple. Using an immediate-annuity payout as a proxy for DB payout at time of retirement, the strategy pays \$64,680 every year (per \$1 million invested) for as long as the annuitant lives.⁸ We do not need to waste paper or pixels graphing this.
2. *Blended DC/DA with low-risk investments.* As noted earlier, some prior work on blending conventional (DC) investing with DAs assumes that the investor will pursue a low-risk, mostly fixed-income strategy. Sexauer and Siegel [2013] wrote,

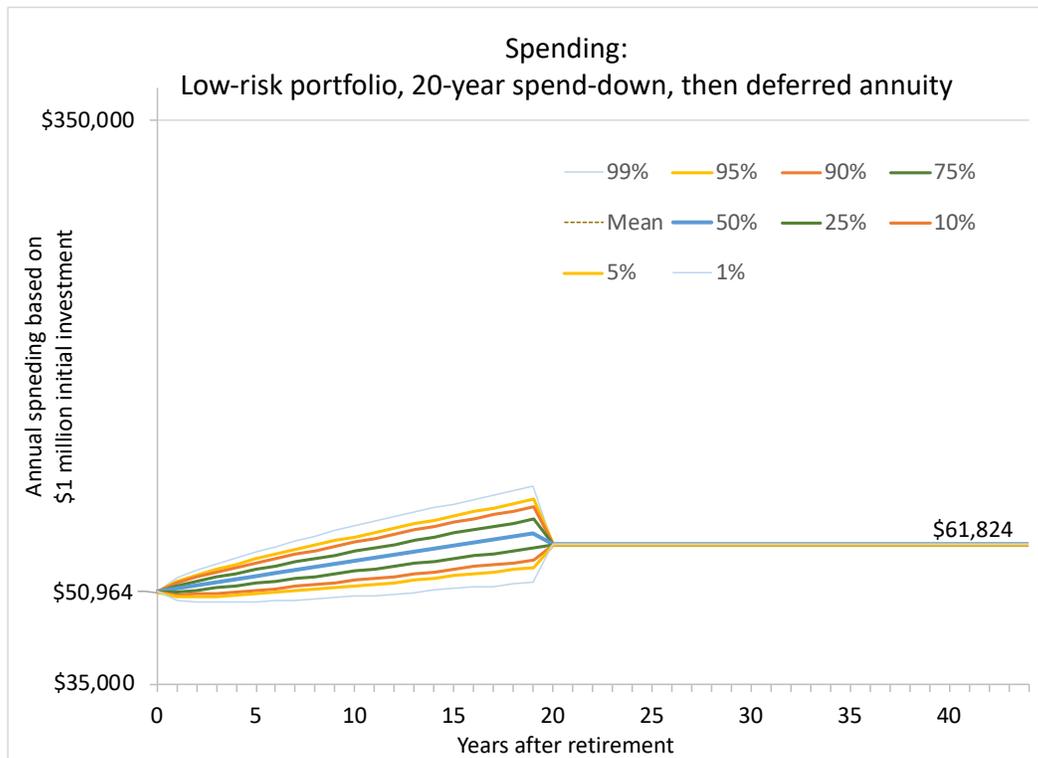
We start by assuming that the investor wants to *guarantee* the desired income level, not merely have a high probability of achieving it. Thus, in building a base case, we assume riskless investing...both before and after retirement....[I]n the accumulation phase, we treat [TIPS] as the riskless asset.

Exhibit 5

Annual spending, low-risk investments (20-year DC spend-down, then deferred annuity purchased with 15% of initial portfolio)

⁷ The authors thank Michael Blake of Botanica Capital for pointing this out.

⁸ As of November 2, 2018, according to immediateannuities.com, the annual payout from a single premium immediate annuity (SPIA) for a single female in Illinois costing \$1,000,000 was \$64,680 per year, for a yield of 6.468%.



Source: Constructed by the authors using Excel™ SIPmath™ add-in

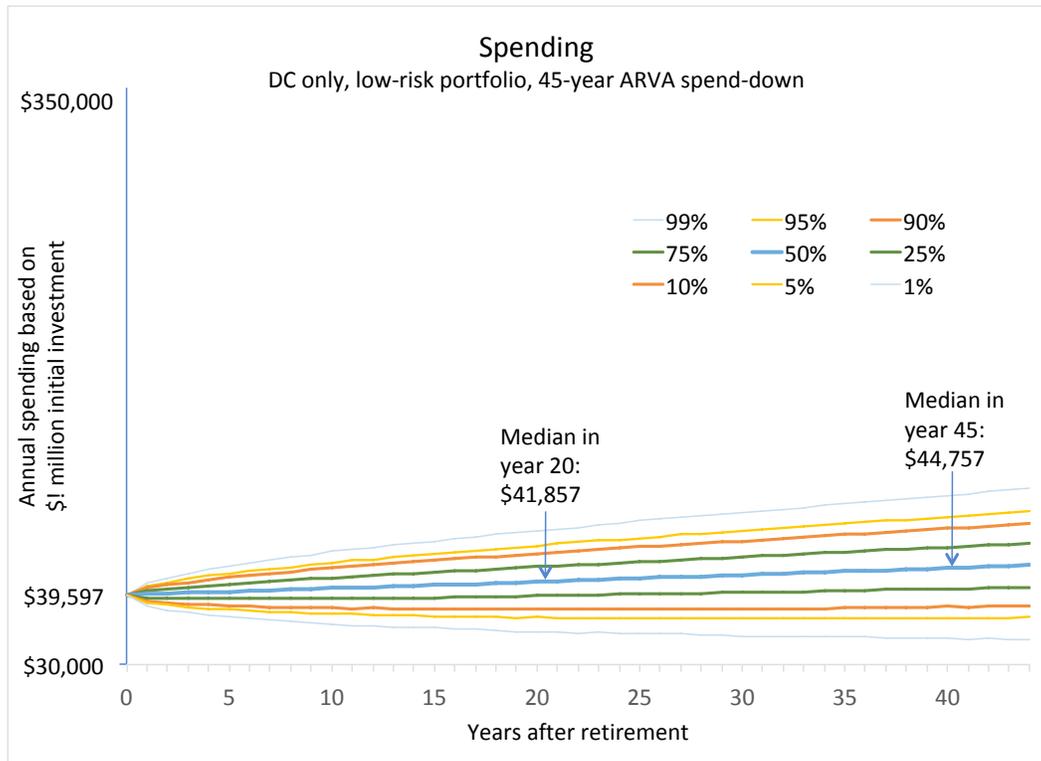
Note that this was a base case or point of departure, not an investment recommendation; few people invest this way. But investors regarding themselves as “liability hedgers” or “income guarantors” hold portfolios dominated by fixed income (especially longer-term or laddered TIPS) and have an expected return and risk profile similar to the 2% risk strategy described in Waring and Siegel [2017].

Now this is starting to look like a DB plan!

Here is Waring and Siegel’s 2% risk portfolio, self-annuitized using ARVA, without risk-pooling annuitization:

Exhibit 6

Annual spending, DC only, low-risk portfolio, \$1 million initial balance, 45-year ARVA spend-down



Source: Constructed by the authors using Excel™ SIPmath™ add-in

The payoffs in Exhibit 5 dominate those in Exhibit 6 – in every year, at each percentile of market performance shown in the diagram. (It’s true that scenarios below the first percentile and above the 99th percentile, which aren’t shown, could “cross,” with the ARVA producing the better payout in some year or years, but that has a negligible probability.) Thus, the blended plan is to be preferred for very low-risk investors as well as for higher-risk investors.

The reason, of course, is the insurance principle: the ARVA strategy in Exhibit 6 involves saving for consumption, with certainty, in years of life that many investors will never experience. It’s good for your kids, though.

The ant strategy: Improving payout after age 85

In Aesop’s fables, the ant saves for tomorrow while the grasshopper lives for today. We show how an investor might pursue an “ant strategy” by saving some of the surplus from favorable market returns, if such a surplus exists, to provide for additional spending beyond the DA payout after age 85.

Note, in Exhibit 1, the abrupt increase or (more typically) decrease in living standards when the DC plan expires and the DA payout starts at age 85. This transition can be greatly improved in states of the world where the market produces a roughly 25th percentile result or better. Given that the 10th percentile of market performance gives a reasonably acceptable spending curve, the investor can consider this to be the baseline spending plan

for age 65 to 85 and save part (or all!) of the DC-plan return above that curve for consumption after age 85.

She can do this either by leaving the money in the plan, diverting it to purchase more annuity units, or both. If the deferred-annuity market is reasonably “complete” (that is, an issuer will sell you what you want), she can purchase additional deferred annuity units every five years, at ages 70, 75, and 80, and then an immediate annuity at age 85, with the money that has been earned in the market but not spent. This is a sensible strategy for 85-year-olds who do not want to take market risk; those who do can simply leave part of their net worth in the market (that is, in the DC plan).

Implementing the blended plan: A freewheeling discussion

We believe we’ve made the case that, by combining conventional investing with a drawdown (full or partial) over ages 65 to 85, followed by payouts for the rest of one’s life from a late-in-life DB plan or equivalent deferred annuity, retirement can be made more secure, comfortable, and lucrative.

We now use a question-and-answer format to raise and, we hope, resolve some qualitative, behavioral, institutional, and legal issues that arise from our proposal.

Why blended plans are not already widely used

Q If blending conventional investing with deferred guaranteed payout for life is such a good idea, why doesn’t anybody do it?

A A few people do. One of us (Totten) operates a firm (Nyhart) that builds 401(k) plans for clients in which 85% of the plan contribution goes to conventional investing, to be spent down at the retiree’s discretion over 20 years, and 15% is earmarked for the purchase of a commercial deferred annuity. Since the earmarked money is the property of the employee, we can’t make them choose the DA, but that is the default choice and we buy it for them if we have their permission.

In addition, we have heard that a registered investment adviser in Milwaukee, Bruce Lanser, defaults clients into an accumulating portfolio of DA credits in addition to conventional equity and fixed income funds.⁹ There are other examples.

Unfortunately, the usual understanding of “hybrid plan” in the corporate community does not hedge longevity risk effectively. It just typically combines a small DB payout with an asset accumulation or DC plan. The DB payout is for life but “small” is the key modifier. With our strategy, we can do better for the employee at comparable cost.

⁹ <http://financialservicesinc.ubs.com/fa/brucelanser/>

Q Then why is your blended strategy so rarely seen in practice, if it is feasible with existing products and under current laws?

A “Hedge tail risk” is one of the first commandments you learn in finance class. But it seems that the risk of having to pay for greater-than-expected longevity is not perceived as a tail risk. We have to educate both plan sponsors and beneficiaries about this risk and demolish the myth that if you’ve planned for “the average,” that is, living to your life expectancy, you haven’t planned well.

There are also institutional and legal obstacles to the strategy, which we’ll discuss briefly.

Q Can you force the employee to accept a DA or mini-DB plan in lieu of 15% of the asset balance they’d accumulate with a DC-only plan?

A You can’t force them to buy the annuity, but you can structure the plan so that the annuity is the default and they have to ultimately make their own decision. By “forcing” the issue in this way, you get around the behavioral hurdle of convincing the employee to make a sacrifice now to get a benefit he or she may not live to see, but will be very happy with if they do in fact live that long.

However, you cannot legally just seize 15% of the employee’s DC balance when they retire and buy them a DA. It’s their money and they can do what they want with it.

In the DA (not mini-DB) version of the plan we’re advocating, the employer (sponsor) and employee agree to it in advance, and then the sponsor just buys the DA for the employee, out of their own accumulated DC balance, when he or she retires.¹⁰ You could make this the only retirement package offered, and see how you fare in the labor market; or you could allow newly hired employees to choose between DC-only and the blended plan.

Portability

Q How can a blended plan be engineered to help employees who change jobs? That has been a major obstacle for DB plans in this age of frequent job and career changes.

A We’re very fond of the Taft-Hartley model – all of the employers in a particular industry put the money into one pot so if you switch employers, the money follows you in that pool. You could do it by industry or you could do it by trade craft. Alternatively, a Chamber of Commerce could create one big plan for all of the small employers in a town; if the employee changes jobs but both employers are members of the chamber, the money follows you. Actually, any voluntary association could do this – a church, an alumni association, the Raccoon Lodge, whatever. In some other countries this is already a common practice.

¹⁰ The sponsor (or sponsors) could also purchase the DA protection in the form of credits accumulated each year over one’s working life. This could be cheaper than buying it at retirement.

Q Haven't Taft-Hartley plans had great difficulty with fund mismanagement?

A Taft-Hartley plans are generally poorly funded and the PBGC reports that the program will be insolvent in its current form by the year 2025.¹¹ The structure of existing Taft-Hartley plans involves a conflict of interest: benefit increases can be awarded by a board composed of both union and management representatives. But the idea underlying Taft-Hartley, of an industry pool to which many employers can contribute and which would be independently managed, offers a superior model. Other countries, such as France and Australia, have comparable models either in pensions or defined contribution schemes.

Q How about lawyers, bankers, nurses, independent businesspeople...?

A They're all trade crafts. So are professors, who are covered by TIAA. You could regard professors as a trade craft or you could regard academia as an industry. Either way, the system works well for professors, because most of them are covered by TIAA, an annuity and investment management company that was founded as a nonprofit organization for the benefit of academics by Andrew Carnegie's charitable foundation in 1918.¹²

Comparison to TIAA

Q Does TIAA help us move down the path you've been describing?

A It gets us about halfway there. They have two classes of products: traditional annuities and CREF variable annuities. You can contribute to either or both while you're working. The CREF variable annuity is effectively a mutual fund, invested in stocks or bonds, that self-annuitizes when you retire, providing a guaranteed lifetime income tied to the balance in your account at retirement.

When you're retired, you can also withdraw money from the CREF account slowly over time if you have a better use for it than guaranteed lifetime income. Thus you can build a customized blend of fixed and variable income streams, or income streams and an asset balance.

Q Does TIAA offer a deferred annuity?

A Not at this time, but we hear they are working on it. If you are a TIAA participant and want a deferred annuity, you would have to withdraw funds from your CREF account and buy the DA yourself.

DA versus mini-DB structure

¹¹ <https://www.pbgc.gov/news/press/releases/pr18-02>.

¹² TIAA has since been converted to a for-profit.

Q Ideally, should the guaranteed lifetime income part of the plan be a DA or a funded mini-DB plan?

A They are economically equivalent if (1) the DA is purchased at retirement with funds that have been accumulating in the employee's account over time, so that the DA is always "fully funded," and (2) the mini-DB plan is in fact economically fully funded. (Many DB plans that purport to be fully funded, aren't, on a proper economic basis.) Under those conditions it doesn't matter. But since DB plan liabilities go on the sponsor's balance sheet and require some fixed infrastructure costs, the DA may be an easier sell.

If you put all the retirement money in the employee's 401(k), the sponsor can expense it immediately. For every dollar put in, \$0.85 goes into the asset bucket and \$0.15 goes into the save-for-a-DA bucket,¹³ so we expense it as we go – no liability goes on the balance sheet. The only thing that is different from a traditional DC plan is that, at retirement, the sponsor buys a deferred annuity for the employee with \$0.15 per dollar accumulated because the plan says they have to. The remaining \$0.85 on the dollar goes to the employee to spend as she wishes for the next 20 years.

We can also take advantage of the QLAC (qualified longevity annuity contract) provision in the tax code to minimize or eliminate the tax impact of withdrawing money from a DC plan to buy a DA.

Counterparty risk

Q Are commercial DAs safe? Will employees trust them to make the promised payouts 20, 30, 40 years down the road? A person could conceivably contribute to the plan at age 20 and live to 105, meaning that a given contribution "dollar" would need to stay in the system for 85 years without being lost, stolen, wasted, lost to bankruptcy, or lost in the market.

A First of all, accumulating DA credits over time is only one way to structure the plan, and it involves ongoing administrative and monitoring costs that a buy-at-retirement approach does not. We suggest that whoever is tracking the money just buy the DA for the employee when he or she turns 65 or retires at some other relatively advanced age. The money has already been contributed so the last employer is not stuck with an extra expense, other than the one-time administrative cost of selecting and purchasing the DA. So the amount of time a dollar stays in the system is limited to about 40 years, not 85.

Also, the exact same problem exists with DB plans, including mini-DB plans.

¹³ Or to purchase DA credits if that is the route the sponsor chooses to take. If that is the strategy chosen, an organization, typically an insurance company, would have to track the credits as the employee moves from job to job and coordinate the payouts from the various DA issuers if there is more than one.

We would continually monitor the DA issuers, and possibly diversify among issuers so the employee is getting payouts from more than one company. The monitoring of the insurers is intended to ensure that, at the time of purchase, the most highly qualified insurers are offered. This is similar to the way pension sponsors choose insurers for pension plan settlements. A review of insurers happens each time a settlement is offered. Should one insurer fall out of favor, they would be removed from the offering. Once the annuity is purchased, however, the annuity must remain with that provider.

Q How does your plan interface with state insurance guarantee pools that have been built to protect annuitants?

A Each state has its own way of guaranteeing annuities. The insurance guarantees are typically quite high. What you can do if you want to be fail-safe is to not exceed a given state's limit. If you're in Illinois and they only guarantee up to \$50,000 a year in annuity payout then we do not put any more into the annuity once you hit that limit. Any money left over in the DA account would go into your conventional asset account and you could either spend down the money yourself or use it buy additional DA credits in the individual market.

There are some precedents here. United Technologies is one of the few companies that help purchase annuities for employees with their 401(k) money. They look at the annuity market carefully every quarter and replace bad choices – that is, those that looked promising when selected but whose quality has deteriorated – with good ones. However, once an annuity contract has been purchased, the purchase cannot be reversed, so it is impossible to eliminate counterparty risk completely through ongoing due diligence.

Motivating employees to retire: The tenured professor problem

Q What's in this for the employer? As was mentioned earlier, employers aren't going to build (or buy) this complicated structure just out of the goodness of their heart.

A If you can help young employees secure an adequate lifetime retirement income, then transitioning them into retirement at an appropriate age should be easier. If you don't have any money, you aren't going to retire. A 70-year-old employee may not be very productive and you can't really fire them so there has to be an economic motivator to get them to retire voluntarily. A secure lifetime income is a very powerful motivator to do that.

Q Isn't that the tenured-professor problem? Universities discovered, when they adopted DC plans, that professors work basically until they die because they are highly paid and are continuing to accumulate assets. With a DB plan, they were working for \$0.40 on the dollar because they would be paid \$0.60 (as a pension benefit) for not working, so they did retire.

A Yes, that is the tenured professor problem. In addition, older employees not only tend to be more highly paid but have higher health care costs.

Q In other writing, one of us (Siegel) has suggested that employees who want to work beyond the traditional retirement age should be encouraged to do so. Ways to accomplish this include reforming labor laws so that older workers could more easily accept reduced wages, work part-time, and keep contributing to retirement plans. If enough people did it, it would help solve the Social Security and Medicare funding problems as well as the inadequacy of retirement savings. Older people who are still economically active also tend to be healthier and happier. How does the blended plan described in this article mesh with the goal of encouraging long work tenure for those who want it?

A For those who want to work later than traditional retirement age, or to pursue a phased retirement where they work part time but also use retirement savings to supplement their income, this plan helps employees achieve their retirement goals. One strategy that phased retirees may employ is to withdraw moderate amounts out of their retirement plan so they can afford to defer their Social Security benefit until age 70. They can continue contributing to the retirement plan and accumulate more deferred annuity benefits while working. This combination of strategies will allow those who work longer to secure a stronger retirement with a larger deferred Social Security benefit and a higher deferred annuity purchase.

Legal and regulatory considerations

Q Is the current legal and regulatory environment conducive to accomplishing the goals you've set out?

A While we could do some of these things today, there would have to be changes in the law to get maximum effectiveness and buy-in. For example, DA issuers have to be registered in all 50 states. This costly requirement inhibits insurance companies from producing and marketing DAs and reduces competition.

More importantly, we'd benefit from removing the fiduciary liability that arises from the employer selecting a DA issuer (insurance company). A law has been proposed that gives some of this kind of relief; as a general principle, regulations and other institutional barriers should be lowered so that employers can more easily provide the kinds of blended plans that we've described.

Conclusion

For any change to take place voluntarily, all stakeholders must perceive a benefit. "Win-win" is the usual, hackneyed metaphor.

Why are we letting employees struggle, as they are, to save for advanced age when the answer, a blended DC and DA (or late-in-life mini-DB) plan, is right in front of us? Almost every employee would see increased utility from this innovation.

Employers, for their part, can improve the package they provide to employees at no greater cost, increasing their ability to attract and retain the desired ones while increasing their

ability to transition employees to retirement when it's time to do so. Our proposed structure thus provides employers with greater flexibility in managing their workforce.

The industry – that is, the investment management and insurance industries taken as a unit – can earn a profit providing these benefits.

With traditional DB plans not coming back, hedging longevity risk within a sponsored retirement plan has become a persistent problem crying out for a solution. It turns out to be a simple engineering task. The technology we've described relies on financial instruments that already exist and cost structures that are already being paid. Let's use it.

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