

***From On Wall Street 9/1/10***

***“Here Today, Here Tomorrow – New Sources of Income for Retirement”***

...with annuities leading the way as the new source of income.

“Annuities that have guaranteed income benefits attached to them are appropriate for a large portion of the population.”

“...guaranteed annuities are really gaining traction now.”

....retirees face greater challenges than ever, with diminishing sources of income, longevity risk and volatile markets ..... are a few of the reasons financial advisors should be talking to their... clients about annuities today.”

***The Wall Street Journal – 9/2/10***

***“Locking in Income for a Lifetime”***

“...the Obama administration wants to prod workers into investing in lifetime income products such as annuities.”

“With an immediate annuity, you make a lump-sum payment to an insurer that promises to pay you a specified sum each month, ..., for as long as you live”

“One approach is to lock in enough income to cover the gap between your Social Security check ..., and your minimum income needs.”

“Mutual fund companies, seeking to hold on to customer assets...rolled out mutual funds designed to provide monthly income....”

“...income from these do –called managed payout funds isn’t guaranteed.....investors have seen their monthly payments shrink.”

***Bloomberg 1/8/10***

***“Retiree Annuities May Be Promoted by Obama Aides (Update 2)”***

“The Obama administration is weighing how the government can encourage workers to turn their savings into guaranteed income streams following a collapse in retiree accounts when the stock market plunged.”

“They are designed to protect against the risk that retirees outlive their savings...”

“...also said annuities have received support from academic research and It iss unclear why individuals usually forego the annuity option”....”

**Buzzle.com**

***“Are Annuities Good Investments”***

“..if you are looking for good investment ideas, then annuities is a pretty good option; especially if you are planning upon retiring in a couple of decades.”

“This, the frank answer is that an annuity can be a very good investment...”

**FT.com**

***“Retirees miss out on annuity boost” 9/20/10***

“Large numbers of retirees are short-changing their pension income.... , by failing to buy an annuity that pays significantly higher rates to those in poor health.”

“ Enhanced or impaired life annuities have been available in the UK since 1995 and pay higher rates than standard annuities due to the assumption that those in poorer health will have a shorter life expectancy.”

“ However, this rate would be boosted by nearly 8 percent a year if the individual had high cholesterol or blood pressure, nearly 18 per cent if diabetes were declared and 26 percent if the man had suffered a heart attack within the last five years and was on medication.”

**Boston.com**

***Annuities can be a key part of your plan to have steady retirement income 9/28/10***

“The peace of mind this brings is to us the most important and often unheralded benefit of lifetime income annuities.”

“What counts most is that if things really turn sour, one’s annuity payments are always there.”

“Living off the portfolio income such as withdrawing interest or dividends only. That’s virtually impossible..... you risk .....running out of money.”

***Forbes.com***

***Getting an Angle on Annuities 5/9/07***

“Even if bond yields were equivalent to the embedded yields in income annuities, the annuities would have the advantage because the logic of acquiring one is to have lifetime income that can’t otherwise be assured.

***Boston.com***

***“Saving for retirement? The new small-business law applies to you, too 10/20/10***

“Many advisers recommend that retirees annuitize at least enough of their savings to pay for basic necessities”

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## Strategies for Promoting Lifetime Income in Retirement Savings Accounts

Retirement, Saving

William G. Gale, Senior Fellow, Economic Studies  
David C. John, Deputy Director, Retirement Security Project

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**Introduction:**

Over the next two decades, an estimated 75 million Americans who were born during the postwar years will retire. A major challenge for them is how to allocate their resources when they do not know exactly how long they will live. If they live longer than expected, they face the dire prospect of running out of funds late in life. Alternatively, and perhaps equally unfortunately, they may be too conservative when drawing down their resources and may unnecessarily forgo consumption that they could safely have enjoyed earlier in their retirement.

Lifetime income can solve this planning problem. Individuals who exchange a portion of their retirement savings for guaranteed periodic lifetime payments are assured of never running out of resources. The annuitant has mitigated the risk of consuming too much too soon or consuming too little over time. The annuity provider assumes the risk that the annuitant may live longer than expected (which would require longer-than-expected payments), but can diversify and, therefore, spread this risk across a large pool of annuitants with different probable and actual life spans.

These comments to the RFI include two major proposals. First, we will discuss ways to use behavioral economics to increase the proportion of workers who choose to take a portion of their retirement savings in the form of guaranteed lifetime income products. Second, we will propose the creation of a federal guarantee on such products so that the worker is protected even if the company that sold the income product goes out of business.

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## **Comments by the Retirement Security Project on Strategies for Promoting Lifetime Income in Retirement Savings Accounts<sup>1</sup>**

*William G. Gale, Director, Retirement Security Project; Arjay and Frances Miller Chair in Federal Economic Policy in Economic Studies at the Brookings Institution.*

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May 2010

### **Introduction**

Over the next two decades, an estimated 75 million Americans who were born during the postwar years will retire. A major challenge for them is how to allocate their resources when they do not know exactly how long they will live. If they live longer than expected, they face the dire prospect of running out of funds late in life. Alternatively, and perhaps equally unfortunately, they may be too conservative when drawing down their resources and may unnecessarily forgo consumption that they could safely have enjoyed earlier in their retirement.

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These comments to the RFI include two major proposals. First, we will discuss ways to use behavioral economics to increase the proportion of workers who choose to take a portion of their retirement savings in the form of guaranteed lifetime income products. Second, we will propose the creation of a federal guarantee on such products so that the worker is protected even if the company that sold the income product goes out of business.

### **The Challenge**

Despite the potential benefits, few retirees purchase lifetime income products through the private market.<sup>2</sup> Among current retirees, private annuities account for less than 2 percent

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<sup>1</sup> This memorandum draws heavily, including substantial passages borrowed verbatim but without quotation marks, from the following RSP papers: Increasing Annuitization in 401(k) Plans with Automatic Trial Income and Automatic Annuitization: New Behavioral Strategies for Expanding Lifetime Income in 401(k)s.

<sup>2</sup> A large literature has developed that seeks to explain this “annuity puzzle.” Early seminal work includes Bernheim 1987; Friedman and Warshawsky 1990; Kotlikoff and Spivak 1981; Mitchell et al. 1999; Yaari 1965.

of total household income.<sup>3</sup> One possible reason for this, supported by a growing body of evidence, is that the individual (as opposed to institutional) markets for lifetime income function poorly. For example, lifetime income products are priced to reflect the higher-than-average survival of current buyers (adverse selection), which makes these products more expensive for the average consumer than they would be if there were a much larger and more diversified group of buyers (Mitchell et al. 1999). A second example is that consumers are unfamiliar with these products, often have misperceptions or biases against them, or may be unwilling or unable to make the effort required to make sensible choices (Hu and Scott 2007). These findings imply that demand would increase and workers would be better off if market function improved and behavioral obstacles were circumvented or mitigated. These problems of pricing and demand will loom ever larger as retirees derive less lifetime income from defined benefit (DB) pension plans and rely increasingly on lump sum payouts from 401(k) and IRA balances (leaving Social Security as their only guaranteed income stream). Indeed, much of policy makers' concern about the shift from DB to 401(k) plans has to do with this current and projected decline in lifetime income.

How should policy makers respond to this decline? The market is developing new lifetime income products that attempt to increase demand by addressing some consumer needs and behavioral obstacles. However, a market solution alone may be insufficient; it appears that these products are not well understood, involve costs that are often not transparent and are at least perceived as often being excessive for average consumers, will have varying success at matching consumers' preferences and needs, and may reach only a select group of consumers. A particular challenge is to ensure that the proposal is flexible enough to accommodate retirees who have varying needs for additional annuitization through private markets since some may already have sufficient protection against outliving their resources through alternative sources such as Social Security, Medicare, and arrangements within their families.

### **The Automatic Approach**

In considering how these obstacles might be overcome with a view to encouraging more lifetime income, it would be natural to consider strategies that include the use of automatic (default) features. The intelligent use of automatic features in 401(k) plans has enjoyed striking success in expanding plan participation and improving investment behavior.<sup>i</sup> There is ample reason to think that the behaviorally-inspired strategies that have worked so well to "automate" and thus improve 401(k) enrollment, contributions, and investment should be extended, as has long been intended, to 401(k) payouts as well.<sup>ii</sup>

Given the success of 401(k) automatic enrollment, would making an annuity the default option at retirement by itself go far toward solving the lifetime income problem? The evidence suggests not. Although a useful element in a strategy to encourage the selection of annuities, the default approach by itself would be far from sufficient. For example, every cash balance pension plan is required by law to make a lifetime annuity the default

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<sup>3</sup> The data are from the Health and Retirement Study and the sample includes adults aged 65 and older in 1999. For more details, see Johnson, Burman, and Kobes 2004.

method of payment, but the vast majority of participants in these plans opt out of the annuity in favor of a lump sum. In cash balance and other hybrid plans, the benefit is framed as an account balance or lump sum, which undermines the effect of the default. Even in traditional DB plans, where the benefit tends to be framed as an annuity, participants often – though not as frequently -- opt for the lump sum if available as an option.

The evidence suggests that, when an annuity is the default and a lump sum is the alternative; most participants opt out of the default in favor of the lump sum, at least where the annuity-versus-lump-sum decision is presented as a momentous, all-or-nothing, irreversible decision affecting one's entire account balance. The force of inertia that gives the automatic or default strategy its power appears to be weakest in these circumstances, and even weaker when the plan has framed the presumptive form of benefit as a lump sum. However, could arrangements be designed to enhance the effectiveness of an automatic or default annuity and make participants more likely to accept it? We believe so.

### **The Proposals to Increase the Use of Guaranteed Lifetime Income Products**

Two complementary strategies could be designed to eliminate or mitigate significant obstacles to the expanded use of lifetime income, without purporting to remove all of the obstacles. Each approach would help address a different, but overlapping, set of concerns, even as innovative product designs also promise to respond to a number of these and other concerns. Both proposals attempt to make it easier for retirees to make sound judgments about financial options that will maximize their retirement security.

#### **An Automatic Trial-Income Strategy**

Our first proposed strategy provides for automatic annuitization of assets in 401(k) plans, with the opportunity for participants to “test drive” income products. Specifically,

- Half of a retiree's assets in a 401(k)-type account would be automatically paid as monthly income for a two-year trial period (the default trial arrangement), unless the retiree affirmatively elected a different form of payout permitted under the plan.<sup>4</sup>
- After the trial period of 24 consecutive monthly payments, the retiree could again opt for alternative forms of payment. Those who made no affirmative choice within a specified period would continue to receive monthly payments as the program converts automatically from trial-period income to permanent income.

This approach has several advantages. First, adding “automatic” (default) features to

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<sup>4</sup>Instead of half, the plan sponsor could choose some other substantial portion. The two-year trial default is part of a more general strategy of using defaults to encourage people to choose income solutions. Automatic features to promote the expanded use of guaranteed income could apply directly to the benefit payout decisions plan sponsors and individuals confront in the distribution phase of the plan or indirectly through plan sponsors' and participants' investment decisions toward the end of their careers. The two-year default explores the use of automatic strategies directly in the distribution phase. (The indirect use of automatic strategies in the investment phase to improve distribution decisions is explored in a forthcoming brief by Iwry and Turner.)

401(k)s allows inertia to work in favor of lifetime income, as it has done in increasing 401(k) participation rates and contribution levels (Madrian and Shea 2001; Thaler and Benartzi 2004). Second, the trial income arrangement would give consumers valuable information about income solutions, giving them a tool to appropriately evaluate their distribution options to ensure a more secure retirement. Third, launching a trial income program through 401(k)-type plans, which have millions of participants, has the potential to mitigate the adverse selection problem in lifetime income contracts and to reduce prices. Fourth, the trial program would leave individuals free to address their individual circumstances and preferences: it initially would provide income for a limited time, and workers who preferred to direct the investment of their retirement assets or take distributions in other forms could opt out either before or after the two-year “test drive”.

### **Phased or Incremental Acquisition of Deferred Annuities**

The second proposal would involve the phased or incremental acquisition of deferred annuities during the plan’s “accumulation phase”. This strategy would make the automatic (default) approach a more powerful tool to promote lifetime income by incorporating three simple but important elements:

- *Avoid “all or nothing”*. First, instead of requiring the traditional all-or-nothing annuitization choice, frame the annuity offer as one that allows the account owner to use only a portion of the account balance to purchase an annuity. For many, it might make sense to annuitize only a portion of the account, and that portion might vary from one household to the next.
- *Avoid “all at once”/“now or never”*. Second, allow plan participants to opt for incremental annuitization over time, rather than confronting them with a single “moment of truth” at which the decision whether or not to take an annuity is thrust upon them. A single point-in-time approach can make the decision process more difficult insofar as it entails both the urgency of a deadline and the high stakes associated with a decision affecting the disposition of what may be their entire life savings. An annuitization decision may “go down easier” if divisible not only in amount (through partial annuitization) but in time (through incremental annuitization that avoids a “now or never” choice).
- *Avoid “never or forever” irreversible decisions*. Third, to the extent possible, allow the consumer to reverse all or a portion of the annuity purchase, at least for a time.

These three elements effectively lower the stakes so that one who passively accepts the default has almost nothing to lose.

In the specific context of 401(k) plans, two particularly promising vehicles could incorporate these three elements and encourage participants to accumulate deferred lifetime income over their working lives.

Invest the employer match in deferred annuities. Most 401(k) plans provide employer

matching contributions. A plan sponsor could make phased acquisition of annuity income units more likely to occur (or could ensure it would occur) by dedicating its employer matching contributions to this purpose during the investment or accumulation phase, either mandatorily or as a default from which participants could opt out. Either approach would be permissible under current law. This also could have the desirable secondary effect of reducing 401(k) participants' overexposure to the stock of their own employers by replacing the traditional mandatory or default investment of many employer matching contributions in employer stock.

Embed annuities in "QDIA" target date funds. Plan sponsors and financial providers might consider incorporating the phased purchase of deferred annuity units into a Qualified Default Investment Alternative, or "QDIA", specified by the Department of Labor as entitled to a measure of fiduciary protection. Probably the most prevalent form of QDIA to date has been the target date maturity or life cycle fund. Often structured as a composite "fund of funds", the target date or life cycle fund generally invests in a mix of asset classes, consisting largely of diversified equities and fixed income investments. A new kind of target maturity or life cycle default fund could facilitate phased purchases of annuities: the steadily growing fixed income component of the life cycle fund might be comprised of fixed annuity income units that accumulate over time and that would be paid out as an annuity at retirement. Thus, fixed deferred annuity units could substitute for the bond component of the life cycle fund, either entirely or in part. (While variable annuities are invested in equities, fixed annuities tend to be backed up, at least indirectly, by insurance company investments in bonds.) As a result, the percentage of 401(k) contributions used to purchase deferred annuity income units would grow as employees approached retirement.

These new life cycle or target date funds would go beyond the funds currently offered insofar as they not only would serve as an investment but also would help manage the post-retirement spend-down of 401(k) assets. In addition, this strategy would be responsive to many households' anxiety, during the current recession and period of extreme market volatility, about the risks of investing in equities and, in some cases, in 401(k) plans generally. A fixed annuity could protect the annuitant from investment risk. However, this may require new arrangements to assure annuitants of the solvency of the annuity provider or, in any event, the safety of their investment in annuities. In addition, while these strategies should drive down annuity costs because of broader use, reduced adverse selection, and plan sponsor bargaining power, further arrangements will be needed to increase transparency of costs and otherwise promote cost reduction.

### **Federal Guarantees on Lifetime Income Payments**

A continuing concern of both employers and workers in the wake of the 2008 financial crisis is whether the firm that has underwritten annuity-like products will actually still be in business and able to provide those payments several decades in the future. This question arises in virtually every discussion with employers about annuity-like products, and is often raised in discussions with legislators.

Under existing law, annuities are insurance products regulated for the most part by states,

and covered in the event a company fails by state guarantee funds. These funds insure up to the present value of an annuity contract up to a set ceiling, usually \$100,000. Most state guarantee funds would pay the difference between the assets available from the failed company for such products and that ceiling from assessments on the remaining companies offering annuity products in that state.

However, the guaranteed amount of \$100,000<sup>5</sup> present value may be substantially less than the value of a worker's actual contract, and result in a sharp cut in his or her monthly income. In such a situation, not only would there be a loss of confidence in the remaining private sector annuity providers, but there would also be political pressure on Congress to quickly establish a federal policy. Non-annuity guaranteed lifetime income products are uninsured since the underlying assets are primarily a worker's own retirement savings balances.

Rather than making policy during a crisis, it would be far preferable to establish a federally backed and uniform guarantee for annuity-like products well in advance of any actual need. This additional perceived safety would encourage workers to purchase annuities and other such products at least up to the maximum guarantee amount.

A number of models could be used to structure the federal guarantee, including a mechanism based on the private sector reinsurance market with an underlying federal guarantee, and an FDIC-like insurance system funded by premiums. In all cases, such a guarantee would also include a requirement that underlying assets meet certain accounting and regulatory standards, and perhaps be segregated in some way in the event an issuer becomes insolvent. The guarantee could apply to both insurance company issued annuities and to other guaranteed lifetime income products offered by other types of companies.

### **Conclusion**

With increased reliance on 401(k) plans in the U.S. retirement income system, an important challenge facing the system is to help retirees manage the risk of outliving their assets. Each of the "automatic" or default strategies outlined here – the incremental acquisition of lifetime income through employer 401(k) contributions or by embedding a deferred annuity in a QDIA, as well as the Gale-Iwry-John-Walker automatic trial income proposal -- is designed to draw on experience and insights from behavioral economics to help replicate, within the 401(k), one of the valued features of the traditional DB pension: guaranteed lifetime income at group rates (and combined, in most cases, with professional investment management).

In addition, retirees need to have the security that their retirement income will not be reduced or ended if the private sector provider of that policy runs into financial difficulty or even goes out of business. While existing safety mechanisms will certainly reduce the probability of such a calamity, they need to be reinforced by some form of federally backed guarantee that both workers and employers can easily understand and rely upon.

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<sup>5</sup> The actual amount of monthly income guaranteed under state guarantee funds would vary according to the age of the contract owner at the time the company fails.

**William G. Gale** is the Director of The Retirement Security Project and the Arjay and Frances Miller Chair in Federal Economic Policy in the Economic Studies Program at the Brookings Institution.

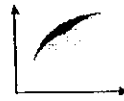
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<sup>i</sup> See Madrian and Shea (2001), Gale et al. (2004), and Gale and Iwry (2005).

<sup>ii</sup> A related goal would be to encourage portability through rollovers. This related topic, which is beyond the scope of this paper, is addressed in J. Mark Iwry and David C. John, " " [testimony before Senate Aging Ctee June 08].

# Efficient Frontier



William J. Bernstein

## The Retirement Calculator from Hell

Most of you have seen the nifty retirement software available from the likes of Vanguard and T. Rowe Price which provides the mathematical muscle to help you plan your retirement. Input your retirement age, expected lifespan, required annual income, rate of inflation and investment return, and hey presto, you find out that to avoid a golden years diet of Alpo you need the GDP of the average Central American republic.

Problem is, it may quite possibly be worse than that. These calculators all make the same erroneous assumption -- that your expected rate of return is the same each and every year. In other words, let's assume that the real (inflation adjusted) rate of return of the S&P 500 will be 7% in the future. You might conclude that you can withdraw an inflation adjusted \$70,000 of your \$1,000,000 Vanguard Index Trust 500 IRA each and every year indefinitely, and maintain yourself with the same real income in the long run. And you'd be wrong.

It turns out that if you have rotten returns in the first decade you will run out of money long before reversion to the mean saves your bacon in later years. To illustrate this phenomenon I went back to good old Uncle Fred's infamous coin toss, with its return of either -10% or +30%. Let's assume that these represent real returns. If over 30 years you toss 15 heads and 15 tails you earn a compounded rate of 8.17%. (If you don't understand why you don't earn the average return of 10% (the average of -10 and +30), then go back and read Chapter One of *The Intelligent Asset Allocator*.) If you start with a \$1,000,000 portfolio and roll alternating heads and tails over the 30 year period, then you indeed can withdraw \$81,700 (8.17% of the initial amount) over the next 30 years before all the money runs out. However, if you are unlucky enough to roll 15 straight tails before rolling 15 straight heads, you can withdraw only \$18,600 per year. Reverse the process and roll the 15 heads followed by 15 tails, and you can withdraw \$248,600 per year.

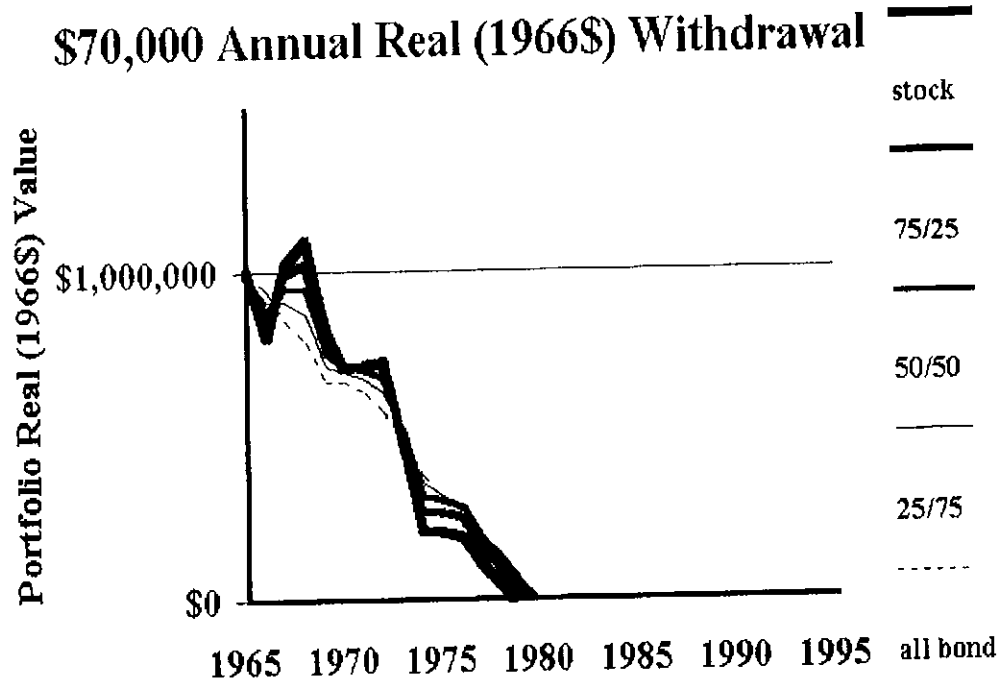
This phenomenon was first brought to the attention of the investing public by Philip L. Cooley, Carl M. Hubbard, and Daniel T. Walz from Trinity University. They looked at the "success rate" of various withdrawal strategies over numerous historical periods, and came to the conclusion that only a withdrawal rate of 4%-5% of the initial portfolio value (i.e., \$40,000-\$50,000 of a \$1,000,000 portfolio) had a reasonable expectation of success. This article can be found in the February 1998 *AAIL Journal*. You can also obtain a lucid explanation of their work as well as their "success tables" on Scott Burns' excellent website.

On a more basic level, however, you can apply a much simpler acid test to your withdrawal strategy: What would happen if the day you retired marked the beginning of a long, brutal bear market, say on January 1, 1966, and you lived for another 30 years, until 12/31/95? For the first 17 years (1966 to 1982) the return of the S&P 500 was a paltry 6.81%. By gruesome numerical coincidence, this was identical to the rate of inflation for the period, making the real stock return for the whole 1966-82 period zero. The return for the next 13 years (1983-95) was spectacular, bringing the real return for the whole 30 year 1966-95 period up to 5.3%, not too far below the historical norm of 7%.

I next constructed an all equity portfolio consisting of 80% S&P 500 and 20% US small stocks, and mixed this with 5 year treasuries. I assumed that one began the period with \$1,000,000 and

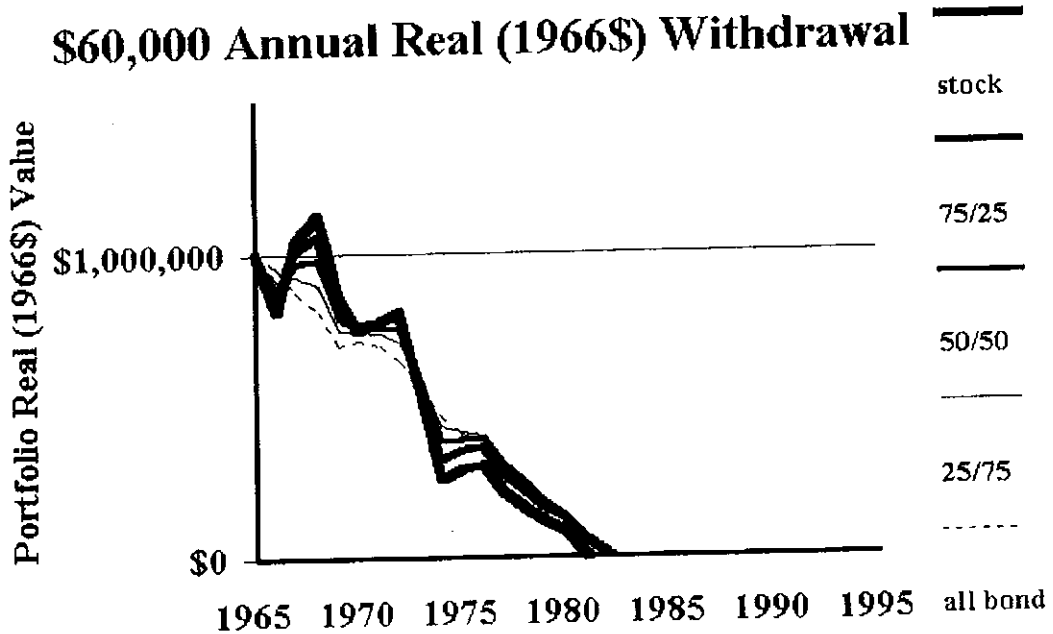
then calculated results of various withdrawal rates from the following mixes: 100% stock, 100% bond, and 75/25, 50/50, and 25/75 mixes of both. The results are plotted below. The all stock portfolio is the thickest line, and the thinner the line, the less stock. Again, it is important to realize that the amounts on the y axes are in *inflation adjusted 1995 dollars*. This is the simplest and clearest way of performing retirement calculations.

First, let's look at withdrawing 7% of the initial amount, or \$70,000 (inflation adjusted), per year:

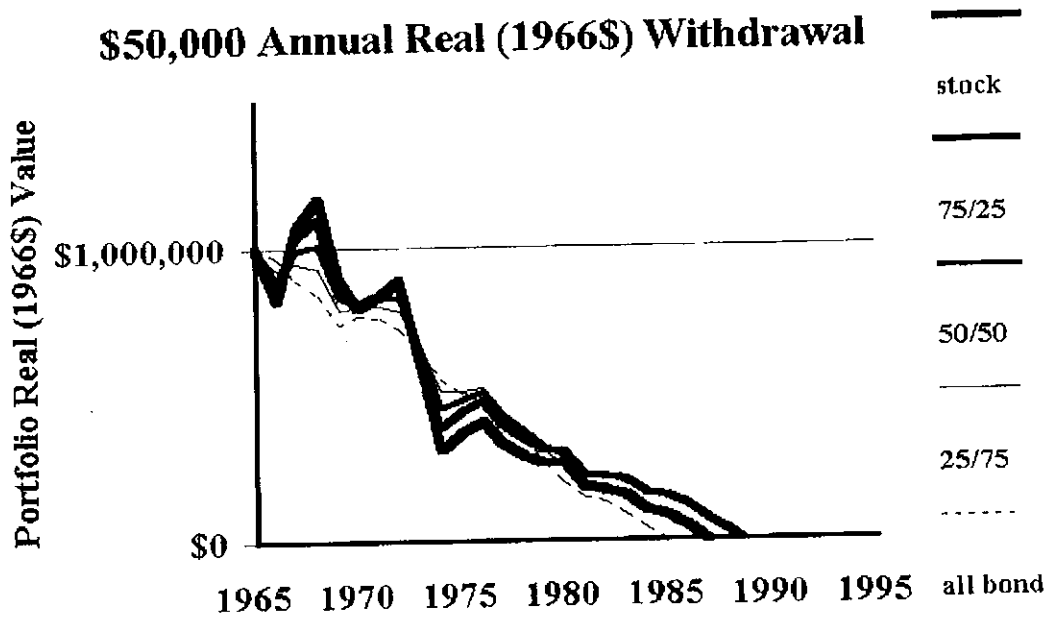


As you can see this is an unmitigated disaster, particularly for the all stock portfolio. All 5 portfolios run out of money in about 15 years, and it really doesn't matter what mix you use. The great bull market beginning in 1984 came far too late to save even the most patient investor.

Next, \$60,000 and \$50,000 (5% and 6% of the initial amount):



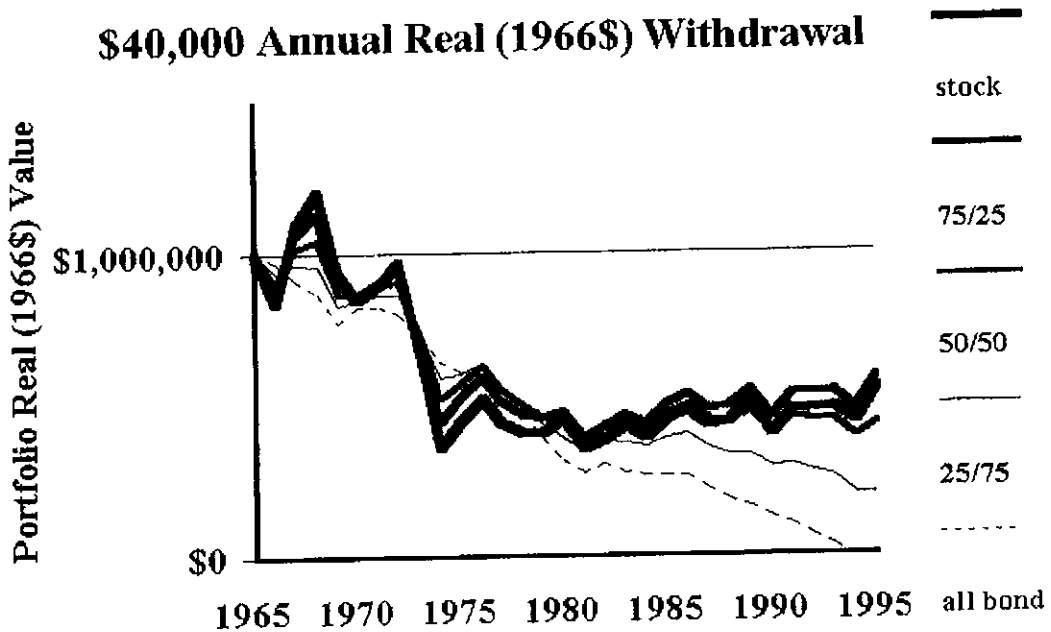
### \$50,000 Annual Real (1966\$) Withdrawal



You still wind up in the alms house, but only after 20 and 25 years. Holding a bit of bonds seems to stretch the money a bit further.

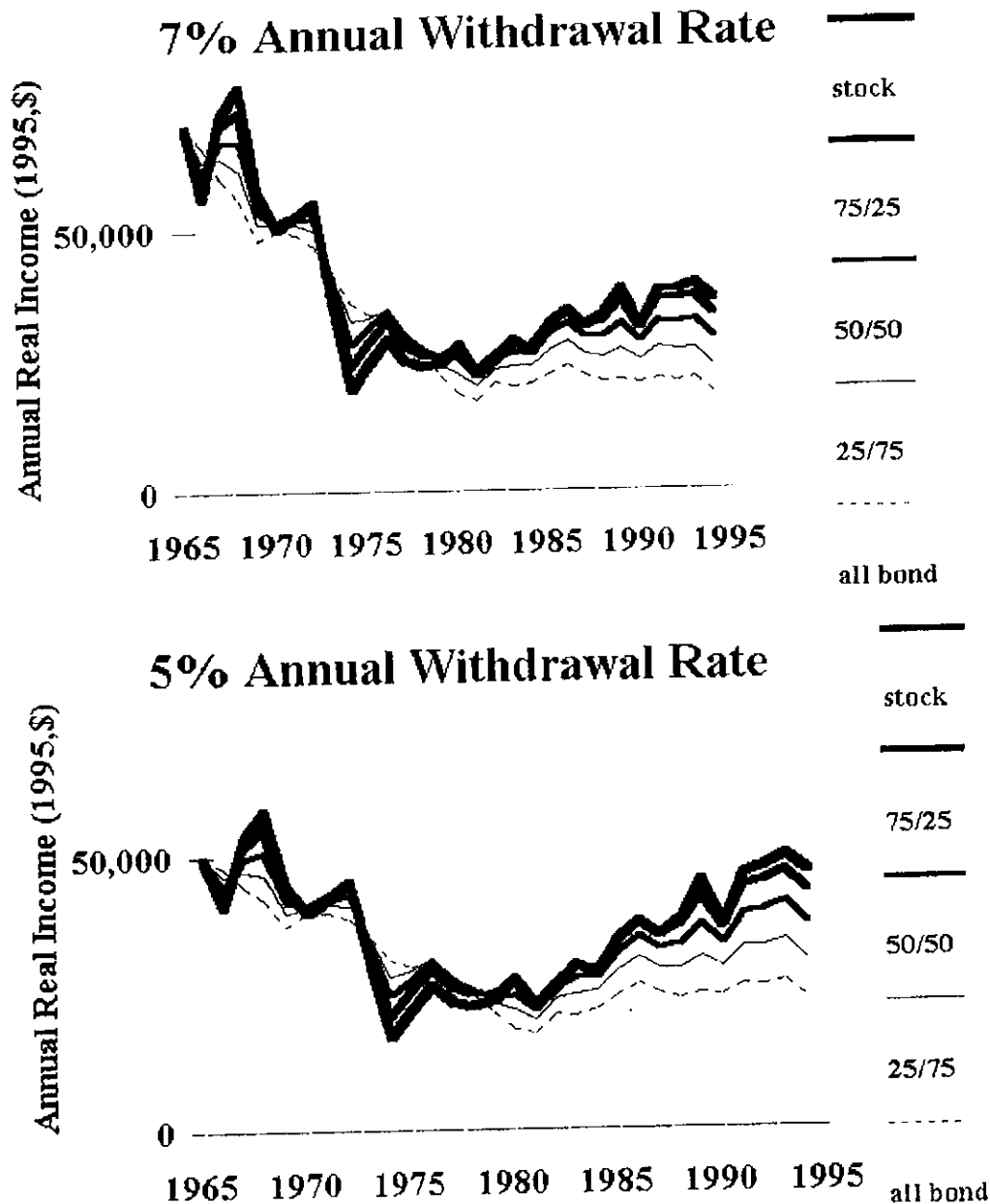
Only at \$40,000 (4% of the initial amount) withdrawal rates do things look a little less grim. All strategies holding 50% or greater stock survive the 30 year period. However, even this route was one wild ride.

### \$40,000 Annual Real (1966\$) Withdrawal



What devastates the above scenarios is the withdrawal of a predetermined inflation adjusted stipend from a portfolio already ravaged by the market. What happens if instead we withdraw a fixed *percentage* (as opposed to a fixed amount) of our principal? In other words, if we start with a nest egg of \$1,000,000, and withdraw 7% each year, we will begin withdrawing at a rate of

\$70,000 per year. If our principal then falls 50%, we are left with only \$465,000, so we can now only withdraw payments at a rate of  $.07 \times \$465,000 = \$32,550$  per year. This approach has the advantage that we never run out of money, although the stipend amount will fall dramatically in some years. I've plotted annual income for 5% and 7% constant percentage withdrawals below. Whereas the plots above showed the real residual portfolio wealth after constant real withdrawals, the below plots show the annual stipends from a *constant percentage* withdrawal:



Note that for a constant percentage withdrawal the all stock portfolio does better than the mixed portfolios. This is because one is effectively "value averaging" into a falling market by reducing one's withdrawals when stock prices are low. But the 7% withdrawal rate is still unacceptable, with withdrawals of less than \$40,000 in all the later years. The 5% rate works better, but one still has to tolerate a stipend amount which dramatically fluctuates with market conditions. Even this strategy is not for the faint of heart. It produced a real \$50,000 income in 1966, which rose to a real \$58,803 in 1968, fell to a real \$19,965 in 1974, rising back to a real \$46,904 by the end of 1995.

Although historical market analogizing can be both embarrassing and dangerous to one's wealth,

this market looks an awful lot like 1966. It would behoove anybody with an investment horizon stretching another 30 years to consider the 1966-95 as a useful reality check.

One point cannot be made often enough -- when you retire, are you going to be withdrawing a *fixed inflation adjusted amount* on a regular basis, or are you going to be withdrawing a *fixed percentage* of your portfolio? This is not a semantic fine point. If you need a fixed amount, plan on withdrawing no more than about 4% of your starting amount in inflation adjusted terms. A fair dollop of bonds won't hurt in this situation.

If you can be more flexible and spend a *fixed percentage* of your nest egg each year, then you can indeed keep you entire retirement stash in stocks and spend 5% annually. Just remember that your stipend will likely fluctuate wildly over the decades of your retirement. Keep a few cans of Alpo in the cupboard if you decide to go this route .

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**Investing your Lump Sum at Retirement**

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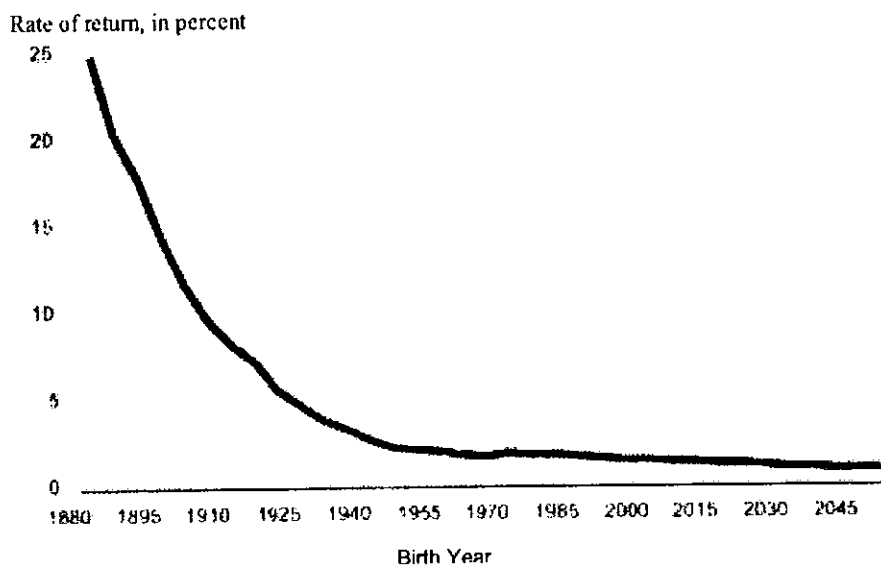
## Introduction

Imagine sitting down on the day of your retirement to plan your financial future. You know what your annual expenses have been and you want to maintain your current standard of living. So, you consult a recent mortality table and find that if you've made it to your 65<sup>th</sup> birthday, you can expect to live to 85 years old. You perform a little calculation and find that, together with your Social Security monthly payments, you have just enough savings to maintain your current standard of living and spend all of your savings and future expected earnings by the time you die at the age of 85. But, what if you live longer? Will you be reduced to eking out an existence on Social Security alone? Where will the additional money come from? What if future investment returns are not what you anticipated at the start of your retirement? These questions are increasingly urgent in America today, as forces are combining to make planning for outliving your resources more important than it has been in the past. Old rules of thumb for spending your assets in retirement, called decumulation, need to be reconsidered.

## The Perfect Storm

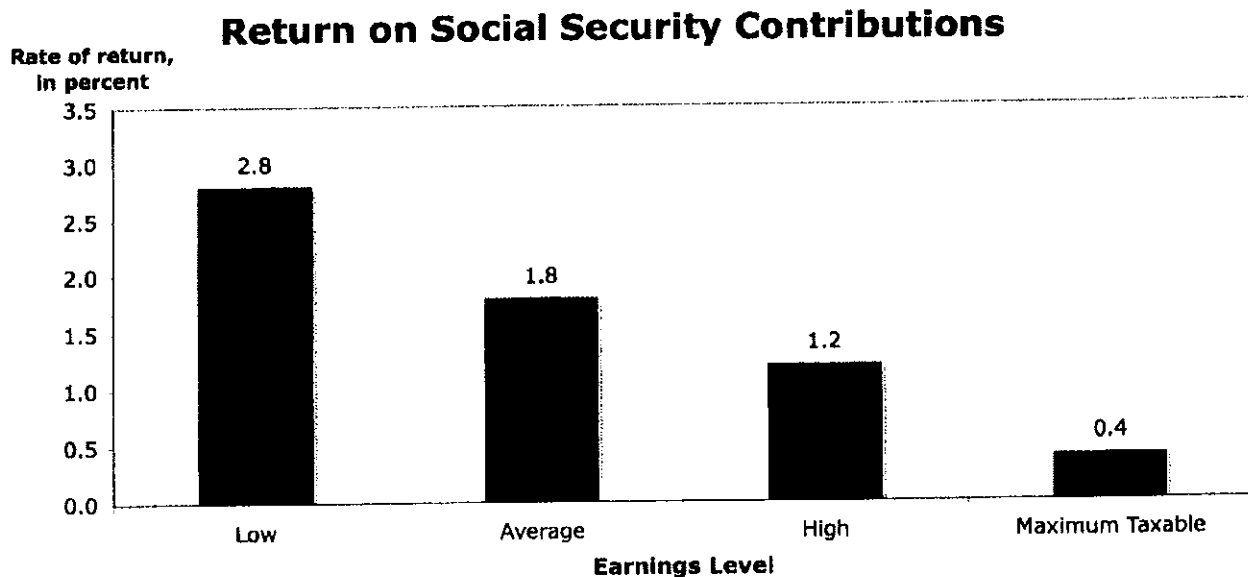
Retirees must take strategic action in the deployment of their accumulated savings and funds as they begin retirement. Five forces are converging upon Americans in what some have called the Perfect Storm – others the Tsunami Wave – that is about to engulf us from all sides.<sup>1</sup> The best we can do is to organize our own finances in such a way that we can provide for ourselves, because there isn't anything we can do to stop these converging forces. These five forces are:

1) The decreasing levels and importance of Social Security benefits. Relative to the benefits provided to our parents, people currently in their working years will receive a much lower return on their Social Security contributions. As can be seen in the chart below, the implicit rate of return on contributions was far higher for earlier beneficiaries. [Source: Social Security Administration.]



<sup>1</sup> See, for example, Philip J. Scrofani, "Perfect Storms and Ticking Time Bombs." *Sage Advice*, October 2005.

The adverse effect of this lower rate of return especially impacts the higher contributors, as shown below. This chart shows that people who had the lowest earnings levels are projected to receive a rate of return on their contributions of 2.8%, seven times higher than 0.4% returns that are projected for those whose earnings were taxed at the maximum levels. However, the rates of return for both groups are very low. [Source: Social Security Administration.]



2) **The demise of defined benefit (DB) pensions.** Over the past 15 years, there has been only one new pension program of any size initiated in the U.S. The number of pension plans in the U.S. peaked at 175,000 in 1983, and has since declined to less than 25,000. While much of the reduction was due to the elimination of small and medium plans, some of the largest pension programs have also been discontinued, closed to new membership, or frozen to all employees. About 30% of the remaining pension programs plan to do close within the coming two years.<sup>2</sup> Many of those that still remain are insolvent or otherwise underfunded, and the government's Pension Benefit Guarantee Corporation (PBGC) is reeling under a load it cannot sustain. During the same time period, 401(k) defined contribution (DC) plans increased from around 17,000 to over 450,000. When all defined contribution type plans are included, there are over 650,000 today. While the reasons for the substitution of DC for DB plans are complex and cannot be covered here, suffice it to say that there is a dynamic change going on in response to various economic factors and government initiatives that will change the way we cope with retirement income needs. Over time, the problem is bound to get worse.

The economic implications for the average individual are significant. Under a traditional pension program, the retiree receives a set monthly income for as long as he or she lives. Under a defined contribution program, such as a 401(k) or 403(b) program, the amount of income you collect after retirement and how long you continue to receive it is anyone's guess. There are no guarantees. In effect, the risk of retirement has been shifted away from the employer and the PBGC that insures the pension benefits, and placed upon the shoulders of the employee. Put another way, the financial risk of retirement has been transferred from those best able to bear it to those less knowledgeable and least able to bear it. In the past, annuitization (discussed below) was less important, as pensions were combined with Social Secu-

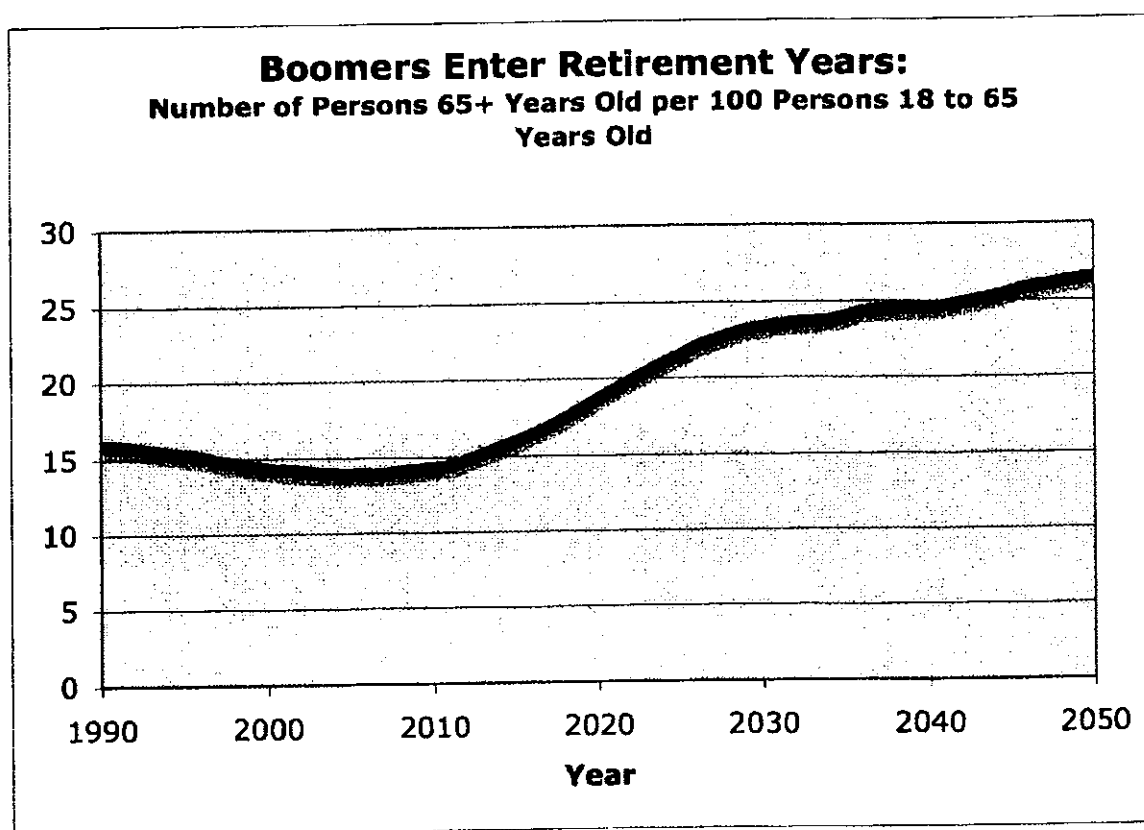
<sup>2</sup> The industry-supported Employee Benefit Research Institute and Mercer Human Resources Consulting study was reported in an article by Peter G. Gosselin entitled "More employers doing away with pensions, study finds." *Los Angeles Times*, July 11, 2007.

erty and handled most of our retirement needs. But today, as pension benefits are gradually (and at times, suddenly) eliminated, and as Social Security benefits stagnate, and are sometimes reduced through delayed eligibility and taxation, annuitization becomes a much more important retirement strategy.

3) The aging of the baby boom generation. Beginning last year, the first members of the largest generation in American history turned 60, leaving their jobs and entering the retirement force. The "boomers," as this generation is commonly known (born from 1946 to 1964), will continue to exit the workforce for at least another twenty years. Currently constituting over 27% of the U.S. population and 47% of all households, they will become dependent upon Social Security, retirement plans, and any accumulated assets.

4) The emergence of post boomers. Generations X (born between 1965 and 1979) and Y (born between 1980 and 2001) will be burdened not only with the responsibility of providing for their own future retirement and health needs, but also with supporting the Social Security and Medicare costs of the boomers. The net effect of this is that there will soon be many more people draining funds from the Social Security system, with far fewer people contributing to it.

In 2006, there were 7.2 persons between the ages of 18 and 65 for each person over 65. Within the next 23 years, this ratio is projected to drop to 3.7, according to the Census Bureau.



5) The increasing longevity of the American population. In the table below, we show how the life expectancy for the population at large has increased over the past century. While expected lifetimes are longer in all categories, the life expectancies for people who reach age 65 are the most relevant for our analysis.

An examination of the table shows that since Social Security began monthly payments in 1940, the number of months we can expect to receive benefits for those of us who reach age 65 has increased by roughly 50% for men and women. Coupled with the fact that when Social Security was instituted, the average person did not live to age 65, increased longevity has placed a tremendous burden upon the retirement system. It should be kept in mind when reviewing this table that these are life expectancies for

the population at large. For people who reach age 65 in good health, the life expectancies are currently about four years longer than shown, and remember that half of those people will live longer, many much longer.

When considered together with the decreasing yields from bonds and lower returns from stocks in recent years, these forces spell disaster for those who do not take more prudent financial measures to prepare for what is becoming the major financial risk of the 21<sup>st</sup> century: living too long.

LIFE EXPECTANCY, BY AGE AND SEX, SELECTED YEARS 1900-2001

Age and sex	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000
At age 65											
Men	11.5	11.2	12.2	11.7	12.1	12.7	13.0	13.0	14.2	15.1	16.2
Women	12.2	12.0	12.7	12.8	13.6	15.0	15.8	16.8	18.4	19.0	19.3
At age 85											
Men	3.8	3.9	4.1	4.0	4.1	4.4	4.4	4.7	5.1	5.3	5.6
Women	4.1	4.1	4.3	4.3	4.5	4.9	4.7	5.6	6.4	6.7	6.8

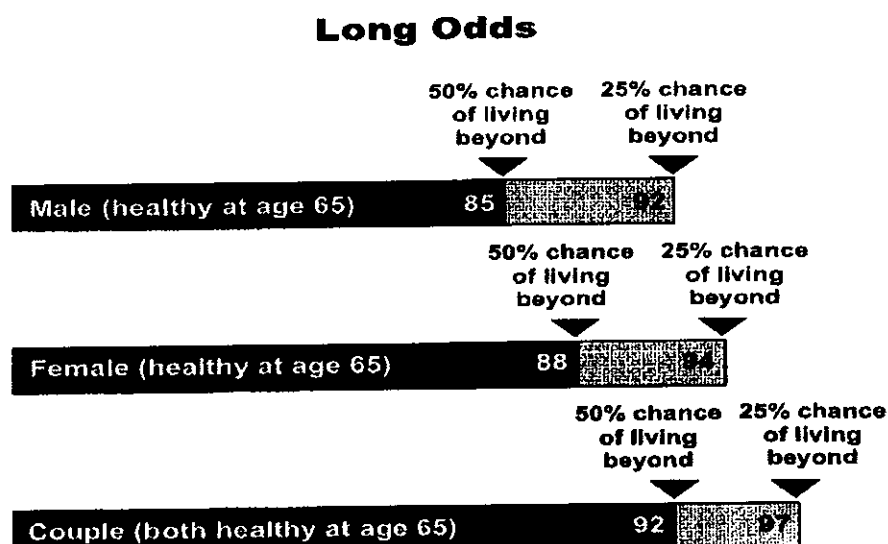
Sources: Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.

So there you have it. The decreasing rates of return on our Social Security contributions, the accelerating demise of defined benefit pensions, combined with the advent of America's largest generation in history now approaching retirement, their longer expected lifetimes, and the much smaller relative population of people who are going to be asked to support their unfunded benefits – taken together we have all the necessary ingredients for the perfect storm – with a few extra ingredients thrown in for bad measure!

## What is Annuitization?

Lifetime income annuities, sometimes called life annuities, income annuities, single premium immediate annuities, or payout annuities, involve large insurers pooling people of similar age and sex, with each person giving to the insurer an amount that will generate sufficient returns to provide them with a monthly income throughout their *expected* lifetimes. Those who die before reaching their life expectancy are, in effect, insuring those who live beyond their life expectancy. In essence, it is the opposite of life insurance, where the payments of those who remain living go to cover the benefits paid to the estates of those who die prematurely. In the case of life annuities, the risk of outliving one's income is pooled among all annuity purchases, providing a kind of insurance against outliving one's assets.

If, at retirement, people plan their finances to cover their economic needs throughout the remainder of their *expected* lifetime, which is roughly until age 86, half of them can be expected to fail. This is simply because half will live longer, and many much longer, than their life expectancy. (See chart below.)



However, if they choose a life annuity instead, they will be able to spend at the same rate, but be covered for as long as they live. A life annuity is the only investment vehicle that features this advantage. Trying to replicate this advantage of a secure lifetime income, but without the risk-pooling of a life annuity, will cost you from 25% to 40% more money, because you would need to set aside enough money to last throughout your *entire possible* lifetime, instead of simply enough to last throughout your *expected* lifetime. Even at this higher cost, you cannot be sure you will achieve a secure lifetime income, because interest rates could change over the next 30-50 years while you are in retirement. (We will discuss this later.)

## Economists' Views of Decumulation

George Bernard Shaw once quipped, "If you laid all the economists end to end, they still wouldn't reach a conclusion." Well, that time-honored adage has changed, at least in one area, because economists have come to agreement from Germany to New Zealand, and from Israel to Canada, that annuitization of a substantial portion of retirement wealth is the best way to go. The list of economists who have discovered this includes some of the most prominent in the world, among whom are Nobel Prize winners. Studies supporting this conclusion have been conducted at such heralded universities and business schools as MIT, The Wharton School, Berkeley, Chicago, Yale, Harvard, London Business School, Illinois, Hebrew University, and Carnegie Mellon, just to name a few. The value of annuities in retirement seems to be a rare area of consensus among economists.

A recent National Bureau of Economics study, which appeared in the prestigious *American Economic Review*, demonstrated under much more plausible conditions than had ever been supposed, that full annuitization was optimal for people who had no desire to leave a bequest to their heirs or charitable organizations.<sup>3</sup> It also concluded that for those with bequest motives, substantial annuitization of retirement wealth was still the most prudent way to act.

In another recent study, we re-examined the unique features of annuitization and showed that people who place their retirement wealth in mutual funds of stock, bonds, the money market, or some combination thereof are subjected to greater risk, often higher expenses, and returns that are unlikely to keep pace with annuity returns, especially when risk is taken into account. The recommendations from our study as well as existing academic models are below.

## Recommendations

Like others before us, we found that substantial annuitization was generally prescribed by a sophisticated model of economic decision-making. The reason we conducted yet another study of this was to incorporate several degrees of greater realism that had not been included in earlier economic models, and to re-examine the annuitization decision in this richer economic context.

The level of annuitization that was considered optimal depended on a number of factors, such as amount of wealth at retirement, level of Social Security benefits accrued, tolerance for risk, desire to leave a bequest, impatience to consume, general level of interest rates, expected return on stock, and stock market risk levels. It also depended on marital status, age, and whether pension income was being earned.

While we cannot present here all of the scenarios that were examined, we can give some general conclusions about what our study showed.

1. You should begin by annuitizing enough of your assets so that you can provide for 100% of your minimum acceptable level of retirement income. Annuitization provides the only viable way to achieve this security without spending a lot more money. The economic models invariably attest to this fact – that the cost of not being able to cover basic expenses far exceeds the potential upside of taking on additional equity exposure. In calculating how much to annuitize privately, subtract from what is needed each month the amount you will be getting from Social Security and any pension benefits you may have accrued.

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<sup>3</sup> Thomas Davidoff, Jeffrey R. Brown, and Peter A Diamond, "Annuities and individual welfare." *American Economic Review*, Volume 95:5 (December 2005), 1573-1590.

Then annuitize a sufficient amount of your assets to provide for the remainder of the monthly income you will need to reach that threshold level.

2. Next, our study shows that you will generally need to annuitize a significant portion of your remaining wealth, while investing the balance in stocks, fixed income securities, and money markets. The economic models of rational behavior, which weigh the riskiness of outcomes against a person's tolerance for risk, all show that equities and fixed income are not substitutes for annuities, because they do not address the major risk we face of outliving our assets. For this reason, economists generally consider life annuities to be a separate asset class. Equities and fixed income can be complements to, but cannot replicate nor substitute for annuitization. How much of the remaining wealth should go to life annuities will depend on the factors discussed below.

a) You will want to make provisions for any extraordinary expenses, such as uncovered health costs and institutional care. These gaps in coverage can be purchased through supplemental health and long-term care insurance, or perhaps from a rider to a life annuity that increases the payments beyond a certain age. For example, suppose that you receive Social Security benefits of \$20,000 per year, and life annuity payments of \$25,000 each year, for a total annual income of \$45,000. If long-term institutional care costs around \$70,000 per year, you will need to get an annuity rider that doubles your annual annuity income to \$50,000, to begin at the age when you are more likely to need institutional care. Taken together with your Social Security, you will reach the targeted income level. Since Social Security is linked to inflation, and the cost of long-term care is influenced by inflation, you may need to allocate a portion of your private annuity money to a contract that provides some escalation in benefits over time.

b) You will want to make provision for your heirs, but balance this provision against your own desire to live above your minimum acceptable living standard. Since the non-annuitized wealth is generally for your heirs, its present value is the same whether you give it to them now or later, because future benefits will be discounted by current yields. Although your heirs might appreciate it more now, at least it is not likely to go away if you live beyond your life expectancy, owing to your decision to annuitize the amount of assets necessary to provide you with a decent living, no matter how long you live.

c) Our study found, as have most other studies, that the greater the tolerance you have for financial risk, the higher the proportion of your excess assets – i.e., assets that are not needed to provide for your minimum acceptable standard of living – could be placed in stock or other risky investments. We never found this level to be much above half of your excess assets. For example, if it takes 60% of your lump sum distribution at retirement, together with Social Security and any pension benefits, to provide the minimum level of income you will need, up to half of the remaining 40% of your assets can be placed in stock if you are exceedingly tolerant of financial risk. In cases where individuals have lower tolerance for financial risk, the portion of excess assets that can be allocated to stock declines to 10% - 30% at age 65. In contrast, optimal annuitization of the excess assets ranges from 40% to 80%, and non-annuitized fixed income generally is 5% or less of your excess assets.

d) Remember, these generalizations depend on the size of bequest you wish to leave, as well as a host of other financial assumptions. One of the assumptions used in the full study was a markup on life annuities of 10%, which is quite a bit higher than we have found in recent months. Today's lower markups would justify even higher levels of annuitization. Finally, we suggest that annuities be purchased only from the most financially sound insurance providers. You will be able to sleep a lot better!

## **Why Don't More People Annuitize - Reasons and Excuses (or, Annuity Myths)**

While public and private annuitization (i.e., Social Security and pensions) were heavy in the past, relatively few Americans not covered by pensions today have chosen to annuitize their wealth through private annuity purchases. Given the alarming confluence of economic and demographic changes occurring today, the number of people choosing life annuities should be larger than ever.

Many market participants believe that "stocks for the long run" is the way to go.<sup>4</sup> But our study showed that over the long haul, unless stocks achieve excess returns above Treasury bonds at least

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<sup>4</sup> This claim recently has been rigorously reexamined and the authors conclude that when corrections are made to remove the statistical bias in compiling historical stock returns and properly account for this estimation risk, a longer

twice as high as they are generally expected to generate, it often makes more sense to annuitize most of one's wealth at retirement. So why don't more people annuitize? Here are some common myths about annuities.

### **1. They cost too much!**

The market for life annuities has become very competitive in recent years, and today the markups in price ("loadings" in insurance parlance) are very low for the people who actually purchase them. During the past decade, these markups above actuarially fair prices have come down from around 6 - 10% to less than half that level from the top companies, approaching zero in some cases.<sup>5</sup> Of course, if you are unhealthy at 65, and have low prospects to regain your health, an annuity purchase may not be the way to go. However, you will be putting your own financial future at risk in so doing, because you really do not know what medical advances will occur, nor how long you will live.

Compare the 0% - 5% *one-time* markups on life annuities with the 1% - 2% *annual* expense ratios levied by typical mutual funds, as well as front-end or back-end loads that sometimes reach as high as 8%, and life annuities compare favorably. And don't forget that life annuities, with their one-time markups, offer lifetime income security. In contrast, mutual funds offer no such guarantees against outliving ones assets.

### **2. What if I get sick?**

There are three ways to provide for hospitalization and nursing care costs that are not picked up by Medicare. Supplemental health insurance can be purchased that covers gaps in Medicare coverage. Long-term care insurance can be used to supplement monthly income to meet the high costs of institutional care, which at the beginning of this decade had already reached an average of \$70,080 a year for a private room and \$61,685 for a semi-private room.<sup>6</sup> The third way might be the least expensive of all, although it does carry some risk. Life annuities are now available that will increase monthly payments by up to 400% when the annuitant reaches a specific age, e.g., 85 years of age. The annuitant can choose an age when the need for institutional care begins to become more likely, and select the desired level of increase in payments. While annuities with this feature cost more than regular annuities that provide level payments throughout life, they can be well worth the extra cost. The risk is that you might need institutional care before the higher income begins at age 85. If, on the other hand, your need doesn't arise by age 85, count your blessings and use the extra income for something else, or save it for a rainy day.

Other innovative life annuities allow you to withdraw as much as 30% of your future payments at five-year intervals, or in case of losses because of a fire, flood, or other natural disaster.

Yes, some of these provisions cost extra money, but you can pay for them now, or pay later at perhaps much higher prices. None of them are really excuses for not annuitizing a substantial proportion of your remaining wealth at retirement.

### **3. What if inflation returns? Won't my fixed payments become worth less?**

Life annuities have evolved considerably over the past several years to address this problem. Today a retiree can elect to have his or her monthly payments increase at rates ranging up to 6% per year. Alternatively, inflation-linked life annuities can be purchased. Both kinds of inflation protection entail receiving lower initial payments, but they grow over time. Indeed, annuities are now available that make it possible to achieve a wide range of income patterns over one's remaining lifetime, to address different eco-

investment horizon requires lower, not higher, allocations to risky assets. See Eric Jacquier, Alex Kane and Alan J. Marcus, "Optimal estimation of the risk premium for the long run and asset allocation: A case of compounded estimation risk." *Journal of Financial Econometrics*, Vol. 3:1 (Winter 2005), 37-55.

<sup>5</sup> For annuity contracts with life guarantees, markups are typically measured against the "actuarially fair cost" of providing a secure lifetime income stream without any loadings for administrative, investment, and distribution costs. Insurers generally set the price of annuities based on their expected investment portfolio returns, but because they guarantee lifetime income streams, economists and actuaries measure their true costs against the actuarially fair price standard.

<sup>6</sup> Spillman and Lubitz, "New Estimates of Lifetime Nursing Home Use." *Medical Care*, Vol. 40:10 (October 2002), 965-975.

conomic needs.

**4. Isn't it cheaper to use some sort of homemade strategy that mimics the behavior of life annuities? That way I can cut out the insurer!**

This would be nice, but it is a fantasy. We don't notice people doing this with life insurance. Why not? Because it takes an insurer to assemble a large pool of thousands of people to fund the payments that go to people who die prematurely. A large pool is also needed to provide predictability and efficient pricing to the provider of insurance, as well as to the consumer. The same pooling principle is behind life annuities, and allows insurers to offer monthly payments throughout your life, no matter how long you live. It is difficult to form a viable pool size if you try this at home on your own!

That hasn't stopped financial economists from experimenting with close to a dozen different investing and budgeting plans to see if mimicking the desirable attributes of life annuities can be done successfully.<sup>7</sup> Thus far, each one exposes the retiree to the possibility of suffering sustained periods of inadequate income, at times even below survival income level. Financial planners sometimes say that a particular favored system may give you a good chance of significantly higher investment returns if your savings are placed in equities or some other favored investment. That may be true. But such homemade systems also carry a risk of running out of income long before one runs out of life. Their sponsors may counter that the risk of such an eventuality, if everything goes according to assumptions and the plan is followed tightly, may be only 15%. That is roughly equivalent to the 16.7% odds of losing in a game of Russian roulette, and few people are prone to participate in such games! Why, then, are people so prone to bet their own income security when it comes to retirement? And what if a particular scheme, by giving up a little of the upside, reduces the chances of failure to half that level? It is sort of like the comfort one receives by substituting a twelve-shooter with eleven empty chambers for the six-shooter.... We have calculated that under today's interest rates, it would take from 25% to 40% more of your wealth to achieve the same secure level of income throughout your possible lifetime that you can get through annuitization. Yes, if you happen to die earlier, you could get by for less and give what remains to your heirs. But if you annuitize, you could give away that 25% to 40% extra cost of providing for longevity contingencies, either now or later, as we explain under Item 5 below.

Another problem with such homemade annuities is the lack of predictability. Phased withdrawal plans require adherence to a strict discipline over the remainder of your life. They require you to consume for many years at a substantially lower rate than the life annuity withdrawal rate in order to maximize the probability that you won't run out of money too soon. What if you, in a moment of weakness, violate the discipline? Moreover, all of the projections about the probabilities that a particular phased withdrawal plan will work in practice are based on *distributional assumptions*. That is a statistician's way of saying that the behavior of the investment in question is being correctly modeled. Quite frankly, we really don't know what the future distribution of returns will be over the next 30 to 50 years, and whether it will match our assumed distribution. While we will not discuss here the important technicalities and economic ramifications of the assumptions embedded in the return distributions used in these programs, suffice it to say that many financial economists have serious concerns about them. Returning to our Russian roulette example, we may know how many chambers are in the pistol, but we don't really know how many of them are empty.

**5. If I put all of my money in a life annuity, will there be anything left for my kids?**

There are several levels upon which this valid question can be answered. First, assume that you put *all* of your money in life annuities (which we do *not* advocate). If you have enough money to give some to your heirs, yet place it all in life annuities, the monthly payments will likely be more than you need to maintain your lifestyle. Therefore, the excess could be saved and passed on to them. The longer you live, the more excess will be available for your heirs.

<sup>7</sup> See, for example, Ivica Dus, Raimond Maurer, and Olivia S. Mitchell, "Betting on death and capital markets in retirement: a shortfall risk analysis of life annuities versus phased withdrawal plans." *Financial Services Review*, Vol. 14 (2005), 169-196, and Moshe Milevsky and Chris Robinson, "Self-annuitization and ruin in retirement." *North American Actuarial Journal*, Vol. 4:4 (Oct. 2000), 113-129. The authors examined several plans and demonstrated that all "homemade" plans would expose the individual to prolonged periods where lifestyle or life itself cannot be sustained.

But if you die soon, there will be very little to pass along. This can be remedied by using some of the extra monthly annuity income to purchase renewable term life insurance, or whole life insurance, which can generate a sizable sum to pass along at death. Alternatively, you could purchase a life annuity with a feature that continues making payments for up to twenty years, or that refunds to your heirs that portion of the premium which has not been received in income, if death occurs within a selected time interval.

Furthermore, if you do not annuitize a substantial portion of your retirement wealth, you pass the financial risk of outliving your resources along to your relatives and children, not to a broad pool. In such cases, your heirs could receive a windfall if you die prematurely, but very little or nothing if you live longer. In essence, lack of annuitization puts the heirs' economic incentives adverse to your own (assuming that you wish to provide a comfortable living for yourself in your old age), whereas annuitization resolves the conflict.

If you determine how much income per month you need to live comfortably for the rest of your life, and fund it, can you give away the rest? Yes, if you annuitize the portion of your wealth that is needed, setting aside some additional funds to cover unforeseen needs (perhaps through insurance). You will continue to receive a comfortable income throughout the remainder of your lifetime. The rest of your wealth you can give away today, if you like, or at the end of your life, if you prefer. The present value is the same, but the heirs may be able to make better use of it if they receive it earlier than later, to cover their children's college expenses, help them get into a house, or other such needs. It is likely that if the heirs were consulted, their preference would be nearly universal for receiving a certain bequest up front, along with a smaller residual claim, than to leave everything for upwards of 40 years and possibly receive nothing.

But suppose you instead invest in some combination of mutual funds the same amount that it would have taken to securely provide for your needs through annuitization. In so doing, your heirs become residual claimants. That is, they receive only what is left over after your passing. Ironically, the longer you live (and thereby the more you consume of your wealth), the less there will be left over for your loved ones. And if you live a long life, you may need your children to care for your physical, emotional, and financial needs. Thus, the longer they care for you, the less they will receive for their efforts (in present value terms). Under annuitization, the insurers absorb all of the longevity risk. Without annuitization, the heirs absorb all of the risk rather than the insurers.

How much better would it be to provide your heirs with a substantial legacy up front, upon retirement or perhaps even earlier, and then, at the end of your life, they can be residual claimants for personal effects and any unused funds?

**6. *If I purchase an irrevocable life annuity at retirement, don't I lose control over those funds?***

Yes. And thankfully, so do your kids! One of the most difficult situations in which older people find themselves occurs when there are many people trying to get their hands on your hard-earned money. Let's face it. Some of us get rather feeble as we age, and our judgment sometimes lapses. We become vulnerable to impassioned pleas from others to "ante up" our savings to them. How many aged people have lost everything in such situations, sometimes even to well-intentioned recipients? Moreover, it also greatly reduces the risk of us overspending.

There is another reason to place these funds beyond our direct control. A recent study has shown that older people typically earn roughly 2% lower annual returns on their stock portfolios, even when adjusted for risk, than investors younger than 60.<sup>8</sup> Sometimes it is best to leave your funds in the hands of experienced professionals, especially when they have contractual requirements to provide you with a well-defined stream of desired benefits, and where their contract is backed by the assets and the entire surplus of a financially solid company. Remember, the greatest economic risk we face today is that we will live longer than our income stream. Sometimes we pay a very high price for maintaining what we think is control.

<sup>8</sup> See George Komiotis and Alok Kumar, "Does investment skill decline due to cognitive aging or improve with experience?" Working Paper, Notre Dame College of Business, January 2006.

### **7. *Shouldn't I wait to buy in case interest rates go up?***

Some people delay annuitizing in the hopes that they can get higher annuity yields if interest rates increase. Very briefly, here are the issues.

It is true that if interest rates increase, annuity yields might also increase. But there are some mitigating factors to consider if you're thinking about delaying to annuitize. First, your accumulated assets need to be invested in something during the interim while awaiting the time to purchase a life annuity. If invested in traditional vehicles, such as fixed income and equities, the value erosion that typically accompanies rising interest rates may offset part or all of the gain that one hopes to garner by delaying the annuitization decision. Second, if life expectancy improves beyond the rate of improvement assumed in current pricing, the prices of the annuities themselves will climb. We calculated that a 1% annual improvement in life expectancy is associated with roughly a 5% increase in the price of an annuity, or a 5% reduction in monthly payouts. This decline in monthly annuity payouts may be offset if the interest rate embedded in annuity pricing also increases, but it needs to increase sufficiently to offset any reduction caused by an unanticipated improvement in life expectancy as well as the probable reduction in accumulated asset values occasioned by high interest rates during the delay period. Third, the awaited rising interest rates may not occur; indeed, the interest rates embedded in annuity pricing may remain stable or decline, leaving the annuitant with lower monthly payments. If interest rates and mortality rates decline together, these income reductions could be substantial.

Nonetheless, recent innovations in life annuity designs include one that allows the annuitant a second shot at higher interest rates. For example, one such product adjusts monthly annuity payments upward by roughly 18% if interest rates increase by 2% or more over the five years since purchase.

## **Conclusion**

When individuals consider the list of positive attributes associated with life annuities, i.e., guaranteed payments you cannot outlive, low cost, access to invested capital, and reasonably priced features such as inflation adjustment and legacy benefits, the argument for this income solution in retirement is compelling. By covering at least basic expenses with lifetime income annuities, retirees are able to focus on discretionary funds as a source for enjoyment. Locking in basic expenses also means that the retiree's discretionary funds can remain invested in equities for a longer period of time, bringing the benefits of historically higher returns that can stretch the useful life of those funds even further. Income annuities may also be a vehicle that enables retirees to delay taking Social Security benefits until they are fully vested, bringing substantially higher payments at that point. The key in all of this is to begin by covering all of the basic living expenses with lifetime income annuities. Then, to provide for additional desirable consumption levels, you will want to annuitize a goodly portion of the remainder of your assets, while making provisions for extra emergency expenses and, if desired, a bequest. These last two items can be accomplished through combinations of insurance and savings. When this is undertaken, you can enjoy your retirement without the burden of financial worries and focus on more productive uses of your time and attention!



AMERICAN ACADEMY of ACTUARIES

Department of Labor/Department of the Treasury Public Hearing on Lifetime Income Options for Retirement

September 15, 2010

Oral Testimony as Delivered by  
Noel Abkemeier, Member, Life Products Committee  
Frank Todisco, Senior Pension Fellow

Good morning. I'm Frank Todisco, and to my right is Noel Abkemeier,<sup>1</sup> and we're here on behalf of the American Academy of Actuaries.<sup>2</sup>

We would like to commend the Department of Labor and the Department of the Treasury for addressing the issue of lifetime income security,<sup>3</sup> and we thank the Agencies for the opportunity to testify today.

We support the Agencies' efforts to facilitate access to, and use of, lifetime income arrangements. From an actuarial perspective, we recognize that lifetime income arrangements protect against longevity risk, the risk of people outliving their financial resources. Lifetime income arrangements are also economically efficient, since it is significantly less expensive to pool longevity risk through a lifetime income arrangement than to "self-insure" the risk by accumulating assets adequate to last until a very old age. Lifetime income arrangements also provide other benefits: they provide retirees with a budgeting signal to help protect against overspending; they help retirees avoid unnecessarily underspending out of fear of outliving their resources; and they reduce senior citizens' money management responsibilities at advanced ages, when they might be significantly less able to manage investments and finances.

A multi-pronged effort would be most effective in expanding access to and use of lifetime income arrangements, including: improving financial literacy; incorporating behavioral finance ideas in disclosures and plan design; utilizing diverse types of lifetime income options to address participant concerns and individual circumstances; and requiring that a guaranteed lifetime income option be offered in tax-qualified plans (more on this later).

We turn now to the Agencies' specific questions, starting with questions two and three, which deal with information to help participants make choices regarding lifetime income arrangements, including disclosure of account balances as equivalent lifetime income streams.

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<sup>1</sup> Frank Todisco represents the Academy's Pension Practice Council and Noel Abkemeier represents the Academy's Life Practice Council. Together their experience covers both retirement security issues and life insurance and annuity product issues. They also meet the professional qualification standards of the American Academy of Actuaries to render actuarial opinions on these matters.

<sup>2</sup> The American Academy of Actuaries is a 17,000-member professional association whose mission is to serve the public on behalf of the U.S. actuarial profession. The Academy assists public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

<sup>3</sup> In May, the Academy submitted written comments in response to the Agencies' *Request for Information Regarding Lifetime Income Options for Participants and Beneficiaries in Retirement Plans*.

How much information should be provided to participants? There is a delicate balance between providing participants with adequate information to make informed choices, versus overwhelming participants with too much information and overburdening plan sponsors with excessive administrative requirements. A tiered approach can be useful. Basic information could be presented on a first page and extended information on a second page for those who wish to dig more deeply.

A set of standardized required disclosures would create uniformity across plans, so that all employees get the same message, regardless of where they work. We recommend that the Agencies provide model disclosures and safe harbors, both for information provided and the assumptions, updated annually, used to derive it, to facilitate good faith efforts to provide accurate and appropriate information. Plan sponsors could always voluntarily go further in providing additional information.

We do support showing the account balance as an equivalent monthly or annual income stream – in fact, an annual amount could provide a more useful comparison against a lump sum, and ought to be considered – and prioritizing it in the order of presentation. The specific wording used to present a lump sum and its equivalent lifetime income should be chosen carefully, based on the findings of behavioral finance, to convey fundamental risks and benefits about these options.<sup>4,5</sup>

In projecting future lifetime income, an assumption has to be made about when the participant will retire. Here, the participant's age for full eligibility for Social Security benefits would be a good choice, for consistency across programs. Also, an assumption has to be made about future contributions to the account. Two possibilities are a continuation of the participant's current contribution rate or a uniform specified percentage of salary for all participants.

It would also be useful to illustrate, as a variation, the effect of contributing one percent more than the assumed contribution rate, in order to demonstrate the effect on retirement security of increased savings. However, such additional information might be relegated to secondary disclosure.

Another consideration is whether the lifetime income amount should include inflation protection, a certain period or other form of death benefit, and coverage for a surviving spouse.<sup>6</sup>

A cautionary note should be raised here: Projecting future income or account balances creates comparability issues because a dollar in twenty years is worth less than a dollar today. Consequently, it would be useful to show projected lifetime income as a percentage of final compensation, that is, as a replacement ratio. Similarly, it would be useful to show any projected lump sum amount as a multiple of final compensation.

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<sup>4</sup> Consider, for example, that the two basic choices could be labeled simply as “monthly annuity” and “lump sum.” But consider an alternative, where the annuity is labeled “guaranteed income for as long as you live, no matter how long”; and the lump sum is labeled “one-time lump sum payment, with no further payments thereafter.” The choice of words can have a significant effect on behavior.

<sup>5</sup> All of this information would be helpful to both participants close to retirement and to younger participants; it would help the younger group start to think earlier about retirement security.

<sup>6</sup> Recognition could also be given in the disclosure of values that lifetime income can be provided not only through traditional annuities but also through withdrawal programs with lifetime guarantees. The distinction is important because the former limits access to assets while providing income and the latter maintains access to assets while generally providing a lower income, though still guaranteed for life.

A second cautionary note involves the way in which future investment return is calculated: whether to use conservative, high-quality bond yields or to include anticipated stock market returns. Including a return on stocks would be problematic, for two reasons: first, it would mean estimated investment returns that varied from participant to participant, based on each participant's asset allocation; second, the projection would be incomplete without substantial additional disclosures about the risks inherent in stock market projections.

There should also be internal consistency among all assumptions. For example, a projection of future contributions to the account requires a projection of future compensation. If compensation is projected to stay level rather than increase, implicitly that means that both inflation and productivity growth are expected to be zero, so that assumed investment return would need to be ratcheted down accordingly. An alternative assumption for future compensation growth would be a standardized rate of anticipated long-term inflation plus productivity growth.

Any projection of annuity conversion rates should reflect anticipated future mortality improvement, since guaranteed lifetime income will continue to become more expensive as longevity continues to increase.<sup>7</sup>

Finally, assumptions should be disclosed, along with caveats about the uncertainty inherent in projecting into the future.

I will now turn the remainder of the Academy's statement over to my colleague Noel Abkemeier.

The fourth set of questions relates to fiduciary safe harbors for selection of lifetime income issuer or product.<sup>8</sup> We'd like to make two points here. First, safe harbors should be expanded in order to facilitate plan sponsors offering a broader range of options, thereby broadening consumer choice concerning lifetime income products. Second, safe harbors should be extended to other lifetime income options besides annuities, again for the purpose of broadening consumer choice.

The fifth set of questions<sup>9</sup> concerns alternative types of lifetime income arrangements. Many solutions exist but the challenge is to raise awareness of them and educate consumers and plan sponsors of their

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<sup>7</sup> Annuity conversion rates could be based on surveys of individual and group annuity prices (such as the PBGC conducts for group annuity prices), which have interest rates, mortality, expense and profit margin embedded within, and then projecting these prices to reflect anticipated future mortality improvement.

<sup>8</sup> We leave it to others to address the specificity of safe harbor design.

<sup>9</sup> The Agencies' first set of questions is about participant concerns regarding lifetime income options. A few words about them here. (i) Two of these concerns are inflation risk and lack of or limits on death benefits and withdrawal options. In fact, there are out-of-plan products that include coverage of these items, albeit at a cost. To the extent participants are unaware of these options, further education is needed. As for in-plan options, in plans where a lifetime income option is offered, inflation or death benefit options often are not included; encouraging plan sponsors to offer these options could lead to increased use of lifetime income options. (ii) Another participant concern related to the long-term viability of an institution issuing a lifetime income product. Substantial protection is provided by life and health insurance guaranty associations in each state, and awareness of this should be created in the education process. Whether any stronger government guarantees should be provided is another policy issue. (iii) Another participant concern is over the fees and complexity associated with some lifetime income products. This can be addressed in part through education and appropriate illustrations and disclosure at the point of sale. Greater standardization of disclosure regarding product features and fees could be one way to improve comparability and participants' understanding of lifetime income products.

value in addressing longevity risk. Having both in-plan and outside-of-plan solutions is essential so that participants in all situations can have access to lifetime income arrangements. Many options already exist outside of plans; it would be helpful to have more lifetime income options available within plans as well.

We support a requirement that some form of guaranteed lifetime income be one of the investment or distribution options offered in tax-qualified individual account plans, provided that the requirement is accompanied by a clear set of regulations that will allow for their effective implementation at reasonable cost and without subjecting plan sponsors to undue fiduciary risk. Individual plan sponsors should also be permitted to make an annuity the default option. Having a variety of lifetime income options within plans to suit varying circumstances is critical to achieving greater use. Among the many variations are (a) partial annuitization, to provide planning flexibility, (b) deferrals to advanced ages, to coordinate with structured withdrawal programs, (c) inflation-adjusted annuities, to add inflation protection to longevity protection, and (d) death benefit options, for those who are concerned about the lack of a death benefit.<sup>10</sup>

Employers could also be encouraged to offer their retirees the option of purchasing an annuity from a defined benefit plan at the point of retirement as a distribution option from the employer's defined contribution plan. One potential stumbling block that would have to be addressed is the coverage by the PBGC of the annuities purchased from the defined benefit plan, in particular the PBGC "priority category" in which such purchases would be placed. The comments we submitted in May addressed this issue in further detail.

Outside of plans, there are many products to address longevity risk. It should be recognized that these are available not only for distributions from plans but also other personal savings. The potential scope of lifetime income should encompass not only tax qualified assets but also nonqualified assets.

Various types of annuities are available in the marketplace. Single premium immediate annuities provide longevity protection and frequently include an option for inflation adjustments. Deferred-start income annuities (DSIA, aka "longevity insurance") are another way to insure against living too long.<sup>11</sup> Required minimum distribution (RMD) rules do not exclude DSIA's; consequently, there is required distribution of assets that have already been annuitized, discouraging the use of DSIA's. One solution would be to exclude DSIA's from RMD's, perhaps up to some limit.

There are also annuity-like lifetime income structures that also address longevity risk, albeit at a lower level of guaranteed income. Guaranteed lifetime withdrawal benefits (GLWB) are available on variable annuities, indexed annuities, and some fixed rate annuities. These provide longevity protection and certain principal protection while providing full access to a retiree's assets. Guaranteed minimum income benefits (GMIB) on variable annuities provide an annuitization floor while providing certain principal protection. A mutual fund structured-withdrawal program is not guaranteed, but it could be complemented with either a guaranteed lifetime withdrawal benefit (GLWB) or a deferred start income annuity (DSIA) to add longevity protection. Disclosure of projected income under one of these guaranteed lifetime withdrawal structures could also be helpful information to plan participants.

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<sup>10</sup> Other approaches can be taken within plans prior to the time of distribution. Incremental annuitization during the working years could spread and reduce investment and interest rate risk. Guaranteed lifetime withdrawal benefit structures could provide longevity and investment protection while maintaining access to asset accumulations.

<sup>11</sup> These work, for example, by purchasing at age 65 a guaranteed income that will begin at age 85. This could be an ideal complement to withdrawal-based income prior to the commencement of the deferred annuity income.

Another important issue in encouraging lifetime income is that standard annuities are poor investments for annuitants in poor health. Substandard annuities are offered by a few insurance companies. Although some allowance is made for significantly impaired substandard annuities in statutory reserving, it may be appropriate to allow greater statutory reserving flexibility to encourage the offering of a full range of substandard annuities.<sup>12</sup>

In closing, we want to reiterate our support for the Agencies' efforts to promote access to and use of lifetime income arrangements. We thank you again for the opportunity to testify, and Frank and I welcome your questions.

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<sup>12</sup> Another issue important to note that there is an incongruity in that gender-neutral annuity rates are required within plans, while gender-distinct rates are used in the marketplace outside of plans. This creates an incentive for females to elect in-plan annuities at actuarially favorable rates and males to elect out-of-plan annuities at actuarially fair rates or to elect annuities less frequently because of the need to go outside the plan. This could disproportionately lead males to fail to annuitize, jeopardizing their retirement security as well as that of their spouses.

# Sustainable Withdrawal Rates From Your Retirement Portfolio

Philip L. Cooley,<sup>1</sup> Carl M. Hubbard<sup>2</sup> and Daniel T. Walz<sup>3</sup>

*This study reports the effects of a range of nominal and inflation-adjusted withdrawal rates applied monthly on the success rates of retirement portfolios of large-cap stocks and corporate bonds for payout periods of 15, 20, 25, and 30 years. A portfolio is deemed a success if it completes the payout period with a terminal value that is greater than zero. Using historical financial market returns, the study suggests that portfolios of at least 75% stock provide 4% to 5% inflation-adjusted withdrawals.*

**Key Words:** Retirement planning, Retirement wealth adequacy

Specifying a sustainable withdrawal rate is an important factor to consider in retirement investment planning. The question we address is what percentage withdrawal rate applied to the initial value of a retirement portfolio can be sustained through a payout period? This is an important question since higher withdrawal rates produce greater retirement income from a given portfolio for a more attractive standard of living but are sustainable only for shorter payout periods. Lower withdrawal rates reduce the risk of running out of funds but provide less retirement income from the portfolio. Thus an investor approaching retirement is faced with the task of evaluating a range of alternative withdrawal rates combined with different portfolio asset allocations and payout periods to analyze their combined effects on retirement income and the survivability of a retirement portfolio.

The sustainable withdrawal rate problem has been addressed recently by Bierwirth (1994), Bengen (1994, 1996, 1997), Ferguson (1996), and Cooley, Hubbard, and Walz (1998). In this paper, we extend the work of Cooley, et al., (1998) by assuming monthly withdrawals of retirement income and monthly accruals of portfolio returns. We also update the analysis to include security returns through December 1997. Our analysis examines the effects of both nominal (constant percentage) withdrawals and inflation-adjusted withdrawals with different asset allocations on the success rates of retirement portfolios. A portfolio is identified as successful if it completes the payout period with a terminal value of zero or greater. Thus we assume that the investor is quite willing to consume principal but wishes to avoid exhausting the retirement portfolio prematurely.

Of course, different investors have different goals. Some plan to leave substantial amounts of their portfolios to heirs. However, the purpose of withdrawal rate analysis is to provide investors with a planning tool that can be used to evaluate the sustainability of various withdrawal rates. Clearly investors who wish to leave an estate must plan to withdraw a lower percentage annually from their portfolios than those who plan to consume most of the principal. Our analysis is presented so that investors can determine the range of withdrawal rates that is likely to achieve their goals.

## Literature Review

In recent years, several studies have investigated the effects of asset allocation and withdrawal rates on the ability of portfolios to sustain retirement income. Much of this research has taken the form of short articles in the popular press suggesting asset allocations or withdrawal rates for retirement portfolios based on personal or professional experience. For example, Peter Lynch argues in a 1995 *Worth Magazine* article that based on his professional experience and knowledge of markets, a retirement portfolio with at least a 50% equity allocation would generally be able to sustain a 7% annual withdrawal rate. Scott (1996) developed tables indicating the combinations between the retirement portfolio withdrawal rate and the portfolio's rate of return that result in portfolio exhaustion for different retirement periods. She found that earning a higher return dramatically increases the allowable withdrawal rate, indicating that many investors should consider increasing the equity allocations of their retirement portfolios.

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### Sustainable Withdrawal Rates

Other studies have taken a more academic approach. Ho, Milevsky, and Robinson (1994) developed an analytical model to determine the optimal allocation between a risky and risk-free asset in order to minimize the probability that withdrawals will prematurely exhaust a retirement fund. Using historical returns from Canadian equities and treasury bills, they concluded that retirement funds should have a significantly larger allocation to equities than argued by conventional wisdom.

Using actual U.S. historical returns for various asset classes, Bierwirth (1994) calculated terminal portfolio values at the time of retirement. He found that the timing of returns affects retirement portfolio value as significantly as differences in mean returns. He illustrated the profound effect that a market "catastrophe" can have on long-term portfolio values.

In three subsequent studies, Bengen (1994, 1996, 1997) dramatically extended Bierwirth's original research. Using annual returns data published by Ibbotson Associates, Bengen (1994) found that a retirement portfolio with a 50% equity-50% long-term bond allocation is able to sustain a 3% inflation-adjusted withdrawal rate for any possible 30-year period starting in 1926. After examining alternative asset allocations and withdrawal rates, Bengen concluded that if the market behaves in the future the way it has in the past, the typical retirement fund should have a 50-75% equity allocation, which would allow a 4% inflation-adjusted withdrawal rate for 35 years.

In his second study, Bengen (1996) extended his first study in several ways. Noting that his experience is that most investors are uncomfortable having their retirement fund invested 50-75% in equities, he investigates the effect of portfolio rebalancing during retirement on the ability of the retirement portfolio to support a minimum of 4% annual withdrawal rate. He found that lowering the equity composition of the portfolio by 1 percentage point each year does not significantly reduce the retirement portfolio's ability to support 4% or higher withdrawal rates. However diminishing the equity composition by 2 or 3 percentage points each a year does significantly diminish the portfolio's ability to support 4% annual withdrawal rates over a 35 year planning period.

Bengen's (1997) third study on this topic built on his previous work in several interesting ways. He analyzed the issue of sustainable withdrawal rates using quarterly portfolio returns instead of annual

returns. He also included small-cap stocks and U. S. Treasury bills as well as larger equities and long-term U. S. Treasury bonds in hypothetical retirement portfolios. He found that initiating withdrawals at different quarters of the year did not significantly change his prior findings regarding withdrawal rate or the optimality of a 50-75% equity allocation. He concluded that investing in U. S. Treasury bills rather than longer term Treasury bonds slightly reduces the portfolio's ability to sustain the initial 4% annual withdrawal rate. He also found that investing up to about 50% of a portfolio's equity allocation in small-cap stocks and the remainder of the equity allocation in large-cap stocks increased a sample portfolio's ability to sustain high withdrawal rates over a longer time period.

Ferguson (1996) took an alternative tack and assumed that investors plan to leave the principal value of the retirement portfolio to heirs. The withdrawal plan he proposed involves consuming dividend income only from an equity-heavy portfolio. He suggested that a withdrawal rate of approximately 3% of the portfolio value would allow such a portfolio to retain its real value in the long run. The author cautioned that withdrawal plan that sustains the real value of a retirement portfolio restricts a retiree to a lower standard of living than withdrawals that ultimately consume the principal.

Using the same Ibbotson Associates (1996) data, Cooley, Hubbard, and Walz (1998) extended Bengen's work in several directions. They investigated the effects of a wide range of withdrawal rates (3 to 12%) on terminal values of portfolios through overlapping payout periods of 15, 20, 25, and 30 years. They also examined the most recent 50-year period (1946-1996) as well as the entire database (1926-1996) of large-cap stock and corporate bond market returns. Cooley, et al., found that a minimum allocation of 50% in equities is necessary to support withdrawal rates of 4% or more per year. In fact, they found that for shorter payout periods (15 years or less) withdrawal rates of 8%-9% are sustainable. They also found that inflation-adjusting the withdrawal rates dramatically lowers present consumption relative to future consumption.

### Data and Methodology

The principal objective of our analysis is to calculate retirement portfolio success rates for various monthly withdrawal rate assumptions and various portfolio asset allocations for the 1926 to 1997 period and for the post-war 1946 to 1997 period. A portfolio of stocks

and bonds is deemed successful at the end of an n-year payout period if its terminal value after withdrawals is positive. The terminal value of a portfolio in the analysis is the value per \$1,000 after reinvestment at actual historical monthly rates of return and after monthly withdrawals.

The advantage of the portfolio success rate methodology is in the ability of the reader to scan a range of success rates relative to withdrawal rates, portfolio asset allocations, and years of payout. Since no methodology can specify an optimal withdrawal rate and portfolio allocation for investors, it is important to present the risk-return tradeoffs in the withdrawal rate decision in a manner that facilitates retirement investment planning.

In planning our study, we considered using life expectancies from various retirement ages as the numbers of years in the payout periods. Since retirements tend to occur between the ages of 55 and 70, the number of different life expectancies for men and women would substantially increase the number of calculations and tables to report. We concluded that the more general approach of providing success rates for 15 to 30 years in 5-year increments would allow the reader to determine which is most applicable to him or her.

As in earlier studies, the monthly data on financial market returns were provided by Ibbotson Associates (1998). The stock returns in the analysis are total monthly returns to the Standard & Poor's 500 Index. Corporate bond returns are total monthly returns calculated from the Salomon Brothers Long-Term High-Grade Corporate Bond Index and Standard & Poor's monthly high-grade corporate composite yield date. Returns for U. S. Treasury bills are 30-day returns reported by Ibbotson Associates. Monthly portfolio returns, month-end values, and month-end values after withdrawals are calculated for overlapping 15, 20, 25, and 30-year periods from January 1926 through December 1997. In that 72-year period there are 58 overlapping 15-year payout periods, 53 overlapping 20-year payout periods, 48 overlapping 25-year payout periods, and 43 overlapping 30-year payout periods.

Calculations of monthly portfolio returns implicitly assume rebalancing of portfolios each month to the desired allocation of stock and bonds. Annual inflation rates used in adjusting annual withdrawals are

calculated from the consumer price index (CPI-U) for 1926 through 1996 published by Ibbotson Associates.

Month-end portfolio values that determine portfolio success rates after nominal withdrawals are calculated as follows:

$$V_t = V_{t-1}(1 + R_t) - W_t \quad (1)$$

in which  $V_t$  is the remaining value of the portfolio at the end of month  $t$ ,  $V_{t-1}$  is the value of the portfolio at the beginning of the month net of the previous month's withdrawal,  $R_t$  is the rate of return on the portfolio for month  $t$ , and  $W_t$  is the amount withdrawn from the portfolio at the end of the month.

Month-end portfolio values that determine portfolio success rates after inflation-adjusted withdrawals are calculated as follows:

$$V_t = V_{t-1}(1 + R_t) - W_t(CPI_{Y,t}/CPI_{1925}) \quad (2)$$

in which the variables are defined as in Equation (1) except  $(CPI_{Y,t}/CPI_{1925})$  is the inflation adjustment for each year's (Y) monthly withdrawals. By multiplying the ratio of the previous year's consumer price index for urban consumers ( $CPI_{Y,t}$ ) to the 1925 value of the CPI, the investor maintains the purchasing power of monthly withdrawals with a one-year lag. Lagging the inflation adjustment enables the hypothetical investor to adjust monthly withdrawals by a known rate of inflation.

Some investors may choose to withdraw funds at the beginning of the month, but that simply scales back the investment capital by one month's withdrawal. In that circumstance the withdrawal rates in Tables 1 through 5 would apply to the reduced investment capital after the first withdrawal. Also, our results would be unchanged by the end-of-month versus beginning-of-the-month timing decision if the actual investment of retirement funds occurs one month prior to the initial beginning of the month withdrawal.

The portfolio success rates in Tables 1, 3, and parts of Table 5 were developed using Equation (1) to calculate terminal values of portfolios and are the result of constant percentage withdrawals through the payout periods without adjustment for inflation. The portfolio success rates in Tables 2, 4, and parts of Table 5 assume that monthly withdrawals are inflation-adjusted and are the result of portfolio terminal values calculated with Equation (2). That is, the investor is

### Sustainable Withdrawal Rates

assumed to initiate withdrawals at a specific withdrawal rate and then adjust each subsequent year's, thus month's, withdrawal amount by the previous year's percentage change in the consumer price index. The objective of inflation adjustment in Equation (2) is to maintain the purchasing power of the monthly withdrawal amount.

As an alternative to the portfolio success rate analysis, we revised the methodology so that the withdrawal rate is the open-ended variable rather than the terminal value of the portfolio. We constrain the terminal value of the portfolio to decline to zero just at the end of the last month of the n-year payout period. We then calculate withdrawal rates, nominal and inflation-adjusted, that are consistent with the zero terminal value assumption for the overlapping 15 year, 20 year, 25 year, and 30 year payout periods for 1926 through 1997 and for 1946 through 1997. Means, medians, standard deviations, minimums, and maximums of the withdrawal rates that just exhaust the portfolios are presented in Table 6.

### Analytical Results

Table 1 reports the portfolio success rates of nominal or constant monthly withdrawals ranging from 0.25% per month (3% annualized) to 1.0% per month (12% annualized) for annual overlapping periods from 1926 through 1997. As described above, the payout periods vary from 15 to 30 years in increments of 5 years, and asset allocations vary from 100% stocks to 100% corporate bonds in increments of 25%. Table 2 is similar to the analysis in Table 1 except the withdrawals are inflation-adjusted annually.

The portfolio success rates in Tables 1 and 2 allow an investor to evaluate the likely success of an initial withdrawal rate. For example, if an investor expected a 20-year payout period after retirement and was willing to accept a 75% success rate, he or she could select the 8% annualized withdrawal rate for nominal withdrawals and an asset allocation of at least 50% stock. If the investor planned to adjust withdrawals for inflation, the portfolio success rates reported in Table 2 justify 6% initial withdrawals from portfolios that are composed of at least 50% stock.

The portfolio success rates in Tables 3 and 4 are derived from post-war (1946-1997) monthly returns and withdrawals. Since the catastrophic events of the Great Depression of the 1930s and World War Two are not likely to be repeated, the post-war data allows the analysis of withdrawal rates and resulting portfolio

success rates with market returns data that may be more relevant for the future. Tables 1 and 3 assume nominal withdrawals and are therefore comparable. Tables 2 and 4 report the effects of inflation-adjusted withdrawals.

The high financial market returns of the 1980s and mid-1990s improve the post-war portfolio success rates reported in Table 3 when withdrawal rates are not inflation adjusted. For a 20-year payout period and a tolerance of 25% failure (75% success), 9% is a viable withdrawal rate for the investor who maintains a 100% stock retirement portfolio. A withdrawal rate of 8% is successful if the investor maintains a portfolio of at least 50% stock.

If the investor plans to adjust withdrawals for inflation, the post-war analysis in Table 4 implies lower withdrawal rates. If the investor with a 20-year payout period prefers a 75% success rate or greater, he or she will limit the initial withdrawal rate to 5% and maintain a portfolio of at least 25% stock. A 6% withdrawal rate with a 100% stock portfolio has a 73% chance of success for a 20-year payout.

Recommended portfolio asset allocations often include an investment in near-cash assets such as U. S. Treasury bills. Table 5 reports the portfolio success rates for a portfolio of 60% stock, 30% bonds, and 10% treasury bills (60/30/10) for 1926 through 1997 and for the post-war period of 1946 through 1997.

The success rates for the 60/30/10 portfolio in Table 5 are comparable to the 50% stock/50% bonds portfolios in Tables 1 through 4 for nominal withdrawal rates. In the inflation-adjusted analyses, the comparability is not as clear, but the 60/30/10 and 50% stock/50% bonds portfolios provide very similar results.

The portfolio success rates reported in Tables 1 through 5 are equivalent to those reported in Tables 1 through 3 in Cooley, et al., (1998) for annualized withdrawal rates of 3% to 7%. For the higher withdrawal rates of 8 to 12%, portfolio terminal values appear to decline faster when the withdrawals are monthly. The comparatively lower portfolio success rates with monthly withdrawals are consistent regardless sample years or inflation adjustment. The analysis of monthly returns and withdrawals in Tables 1 through 4 suggests that choosing a withdrawal rate of 8% or greater is somewhat riskier than portrayed in Cooley, et al., (1998), which relies on annual returns and assumes annual withdrawals.

**Table 1**  
**Portfolio Success Rate with Monthly Withdrawals: 1926 to 1997**  
 (Percent of all past payout periods supported by the portfolio)

Payout Period	Annualized Withdrawal Rate as a % of Initial Portfolio Value									
	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%
<b>100% Stocks</b>										
20 years	100	98	96	94	91	83	72	58	45	40
25 years	100	98	96	92	88	75	58	44	38	29
30 years	100	98	95	91	84	74	60	49	37	33
<b>75% Stocks/25% Bonds</b>										
20 years	100	100	100	96	94	83	68	51	38	30
25 years	100	100	98	96	90	73	50	40	29	19
30 years	100	100	98	95	88	63	51	35	26	14
<b>50% Stocks/50% Bonds</b>										
20 years	100	100	100	100	98	83	55	36	17	4
25 years	100	100	100	100	94	58	35	13	2	0
30 years	100	100	100	98	81	42	19	5	0	0
<b>25% Stocks/75% Bonds</b>										
20 years	100	100	100	100	100	62	23	11	4	0
25 years	100	100	100	100	60	17	6	0	0	0
30 years	100	100	100	95	21	5	0	0	0	0
<b>100% Bonds</b>										
20 years	100	100	100	91	47	36	15	4	0	0
25 years	100	100	96	48	29	8	2	0	0	0
30 years	100	100	53	26	2	0	0	0	0	0

20 years = 53 overlapping periods; 25 years = 48 overlapping periods; 30 years = 43 overlapping periods  
 Results for 15 years are available from the authors.

**Table 2**  
**Portfolio Success Rate with Inflation Adjusted Monthly Withdrawals: 1926 to 1997**  
 (Percent of all past payout periods supported by the portfolio)

Payout Period	Annualized Withdrawal Rate as a % of Initial Portfolio Value									
	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%
<b>100% Stocks</b>										
20 years	100	100	91	77	66	57	42	32	28	19
25 years	100	100	85	69	56	42	33	29	25	15
30 years	100	98	81	65	56	44	33	33	19	7
<b>75% Stocks/25% Bonds</b>										
20 years	100	100	94	77	66	51	38	19	17	6
25 years	100	100	85	65	50	33	25	13	4	0
30 years	100	100	86	63	47	35	14	7	0	0
<b>50% Stocks/50% Bonds</b>										
20 years	100	100	92	75	55	30	17	9	2	0
25 years	100	100	79	52	31	15	4	0	0	0
30 years	100	95	70	51	19	9	0	0	0	0
<b>25% Stocks/75% Bonds</b>										
20 years	100	100	89	51	28	15	9	4	0	0
25 years	100	96	48	19	17	6	0	0	0	0
30 years	100	74	26	19	7	0	0	0	0	0
<b>100% Bonds</b>										
20 years	100	96	57	23	15	13	9	0	0	0
25 years	100	52	19	15	10	0	0	0	0	0
30 years	79	19	16	12	0	0	0	0	0	0

20 years = 53 overlapping periods; 25 years = 48 overlapping periods; 30 years = 43 overlapping periods  
 Results for 15 years are available from the authors.

**Sustainable Withdrawal Rates**

**Table 3**  
**Portfolio Success Rate with Fixed Monthly Withdrawals: 1946 to 1997**  
 (Percent of all past payout periods supported by the portfolio)

Payout Period	Annualized Withdrawal Rate as a % of Initial Portfolio Value									
	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%
<b>100% Stocks</b>										
20 years	100	100	100	100	100	94	79	61	45	45
25 years	100	100	100	100	100	82	57	39	39	29
30 years	100	100	100	100	100	83	61	48	43	35
<b>75% Stocks/25% Bonds</b>										
20 years	100	100	100	100	100	94	73	48	39	33
25 years	100	100	100	100	100	79	46	36	29	18
30 years	100	100	100	100	100	65	48	35	26	13
<b>50% Stocks/50% Bonds</b>										
20 years	100	100	100	100	100	88	55	36	15	6
25 years	100	100	100	100	100	54	32	7	0	0
30 years	100	100	100	100	83	35	13	0	0	0
<b>25% Stocks/75% Bonds</b>										
20 years	100	100	100	100	100	52	21	9	6	0
25 years	100	100	100	100	50	14	4	0	0	0
30 years	100	100	100	96	9	0	0	0	0	0
<b>100% Bonds</b>										
20 years	100	100	100	85	39	33	18	3	0	0
25 years	100	100	93	46	21	14	4	0	0	0
30 years	100	100	52	13	4	0	0	0	0	0

20 years = 53 overlapping periods; 25 years = 48 overlapping periods; 30 years = 43 overlapping periods  
 Results for 15 years are available from the authors.

**Table 4**  
**Portfolio Success Rate with Inflation Adjusted Monthly Withdrawals: 1946 to 1997**  
 (Percent of all past payout periods supported by the portfolio)

Payout Period	Annualized Withdrawal Rate as a % of Initial Portfolio Value									
	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%
<b>100% Stocks</b>										
20 years	100	100	91	73	64	55	39	33	27	21
25 years	100	100	82	61	46	39	32	29	29	21
30 years	100	100	74	57	48	43	35	35	22	13
<b>75% Stocks/25% Bonds</b>										
20 years	100	100	91	70	61	45	36	21	21	9
25 years	100	100	75	50	39	29	25	14	7	0
30 years	100	100	74	48	35	35	13	9	0	0
<b>50% Stocks/50% Bonds</b>										
20 years	100	100	88	64	42	27	15	3	0	0
25 years	100	100	64	36	25	11	0	0	0	0
30 years	100	91	48	35	13	0	0	0	0	0
<b>25% Stocks/75% Bonds</b>										
20 years	100	100	82	48	21	0	0	0	0	0
25 years	100	93	36	4	0	0	0	0	0	0
30 years	100	65	9	0	0	0	0	0	0	0
<b>100% Bonds</b>										
20 years	100	100	58	9	0	0	0	0	0	0
25 years	100	54	4	0	0	0	0	0	0	0
30 years	91	0	0	0	0	0	0	0	0	0

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20 years = 53 overlapping periods; 25 years = 48 overlapping periods; 30 years = 43 overlapping periods  
Results for 15 years are available from the authors.

Tables 1 through 4 report several counter-intuitive portfolio success rates for 30-year payout periods in portfolios of 75% and 100% stock with high withdrawal rates. The tables report 18 instances where portfolio success rates for 30-year payout periods are greater than the success rates for 25-year payout periods. If a withdrawal rate is not successful in providing 25 years of retirement income, how can it be successful for 30 years? The explanation of these results has to do with the number of overlapping payout periods of 25 years versus 30 years used in calculating percentage success rates. The final five 30-year payout periods do not begin on the same date as the final 25-year payout periods and end 30 years later. All of the overlapping payout periods end on December 31, 1997. If the 25-year payout periods were limited to 43 periods all beginning at the same month as the 30-year payout periods, the success rates of the 30-year payout periods would be equal to or less than that of the 25-year payout periods. Thus the anomalous results in the 25-year and 30-year payout periods are unfortunate byproducts of the overlapping periods methodology adopted for this paper and applied in most of the literature on this topic.

The analysis reported in Table 6 addresses the problem of withdrawal rates and portfolio success from a different perspective. For each n-year payout period of monthly historical returns, a withdrawal rate is calculated that reduces the value of the portfolio to zero just at the end of the last month of the payout period. The means, medians, and other descriptive statistics of the marginally successful withdrawal rates for the 15, 20, 25 and 30-year payout periods are reported in Table 6 for all months from January 1926 through December 1997 and also for January 1946 through December 1997. Part A of Table 6 reports nominal withdrawal rates, and Part B reports inflation-adjusted withdrawal rates. Only the 60/30/10 portfolio was considered in the analysis reported in Table 6.

The figures in Table 6 suggest that risk neutral investors who are willing to accept a 50% probability of portfolio success may plan to withdraw substantial amounts. A similar conclusion could have been drawn from Tables 1 through 5. However, Table 6 provides convenient information on the distribution of marginally successful withdrawal rates. For example, the investor who plans on a 20-year payout period of inflation adjusted withdrawals would examine the figures in the lower right hand corner of the table. The

mean and median withdrawal rates are very close at 7.4% and 7.2%, and the minimum such rate is 4.9%.

### Summary

This paper reports the effects of withdrawal rates, nominal and real, on success rates of retirement portfolios of stocks and bonds. The financial market returns used in calculating terminal values of portfolios are monthly returns to large company stocks, high-grade corporate bonds, and 30-day U. S. Treasury bills reported by Ibbotson Associates for January 1926 through December 1997. The analysis is repeated for the January 1946 through December 1997 post-war period. The findings are similar to those reported in Cooley, et al., (1998). Monthly variations in stock and bond market returns plus monthly withdrawals appear to reduce portfolio success rates for higher (8% +) withdrawal rates.

As Cooley, et al., (1998) concluded, investors who expect long payout periods should choose an asset allocation that is at least 50% common stock and a lower withdrawal rate. Conversely, a higher withdrawal rate appears to be sustainable for shorter payout periods, such as 15 or 20 years, provided the portfolio has a substantial percentage of stocks. Investors who plan to inflation adjust withdrawals should choose lower withdrawal rates and invest at least 50% of the portfolio in stocks. Finally, the lower withdrawal rates of 3% and 4% recommended by some analysts appear to be excessively conservative for portfolios with at least 50% stock, unless the investor wishes to leave a substantial portion of the initial retirement portfolio to his/her heirs.

Since the choice of a withdrawal rate involves individual preference for current consumption, uncertainty of life expectancy, and variable financial needs, there is no single globally optimal withdrawal rate. Each investor must determine the appropriate balance of the risk of running out of funds versus a higher, more enjoyable standard of living early in retirement. Most authors tend to favor a more conservative approach that virtually guarantees a substantial positive terminal value of the retirement portfolio. Such an approach exchanges post-retirement quality of life for end of life financial security. Some retirees may prefer not to make that tradeoff. In the final analysis the choice of a portfolio withdrawal rate, within a reasonable range, requires very personal choices that perhaps are beyond the scope of financial analysis.