



## RETIREMENT INCOME SOLUTIONS



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In 2008, the first baby boomers turned 62 ushering in a major retirement wave as the population over the age of 65 is expected to double to 72 million between the years 2000 and 2030.<sup>1</sup> This retirement wave is commencing in tandem with the worst equity bear market since the Great Depression. This second bear market in less than a decade calls into question the prudence of baby boomers entering their retirement years significantly depending on their personal savings as their primary retirement income source. This paper reviews the methods and risks associated with retirement income investing and proposes a solution of combining single premium immediate annuities (SPIAs) with personal savings to significantly reduce the risk retirees will run out of money during their retirement years.

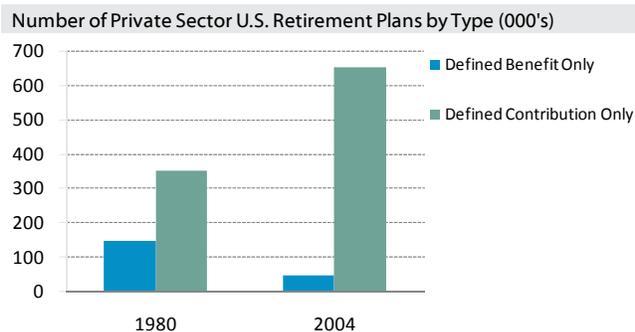
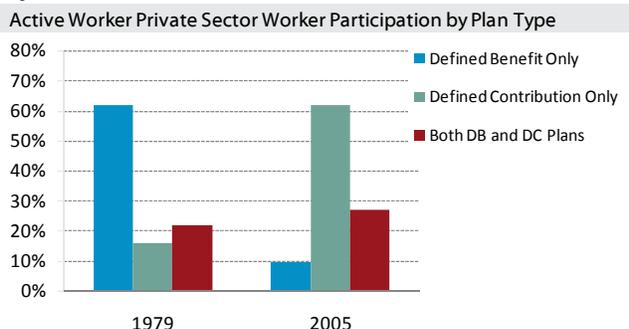
## RETIREMENT INCOME SOURCES

Retirees depend on four main sources for retirement income.

1. Social security
2. Defined benefit plans
3. Personal savings, such as Individual Retirement Accounts (IRAs), 401(k) plans and other after-tax savings
4. Employment earnings

While the retirement income mix will vary by individual retiree, a significant retirement income trend over the past 25 years is the decline in defined benefit plans and the corresponding increase in defined contribution plans. The tables below illustrate this shift.

Figure 1



Source: Employee Benefits Research Institute

The movement toward defined contribution plans as the primary employer sponsored retirement vehicle has significant ramifications for retirees. Future retirees will be more dependent on personal savings, primarily in the form of 401(k)/IRA assets, to fund their retirement than past retirees, who had greater access to defined benefit plans.

A 2005 survey by the Pew Charitable Research supports this conclusion.

Figure 2

Largest Source of Retirement Income

	Current Retirees	Boomers (Ages 41-49)	Adults (Ages 18-40)
Social Security	42%	21%	13%
Employer Pension Plan	21%	19%	11%
401(k)/IRA Savings	21%	49%	66%
Other	9%	4%	3%
Don't Know	7%	7%	7%
<i>Number Surveyed</i>	891	968	968

Source: Pew Charitable Research

## RETIREMENT INCOME RISKS

The primary retirement income sources are subject to various risks, both individually and collectively. The Retirement Income Industry Association identified the following retirement income risks.

1. Inflation risk
2. Longevity risk
3. Market risk
4. Spending Risk
5. Income Risk
6. Issuer Risk
7. Health Care Risk
8. Household Shock Risk
9. Public Policy Risk

The first five risks listed are investment related, in that they can be mitigated based on how the retirement income portfolio is structured. Understanding and managing these investment related risks is paramount because they are increasing due to the continued shift toward personal savings as the primary retirement income source. Personal savings is the riskiest way to fund retirement while inflation-indexed annuity

programs such as Social Security are the least risky sources of retirement income.

Social security benefits have minimal investment related risks because the payments are guaranteed (eliminating market risk), are adjusted for inflation and continue throughout the retiree's life (eliminating longevity risk). The primary risk for social security is the public policy risk that benefits will be modified as the U.S. Government grapples with a projected shortfall in funding relative to the benefits promised.

Defined benefit payments are also guaranteed, eliminating market risk. These payments extend throughout the primary beneficiary's life and in some cases the life of the surviving spouse, mitigating longevity risk. On the other hand, defined benefit payments are usually fixed at a certain dollar amount so they are exposed to inflation risk as the real purchasing power of the pension payment is reduced over time due to the general rise in prices.

Personal savings, such as IRAs, are exposed to the full spectrum of investment related risks. Unlike social security and pension plans with their guaranteed payment streams, retirees are responsible for investing personal savings in a manner that allows for lifetime inflation adjusted systematic withdrawals. This difficult task exposes personal savings to longevity, market, inflation, income and spending risks. Retirees who don't adequately manage these risks face retirement ruin when their primary source of retirement income, their personal savings, runs out. Retirees can also overcompensate for these risks by underspending, leaving more than desired for bequests upon the retirees' passing.

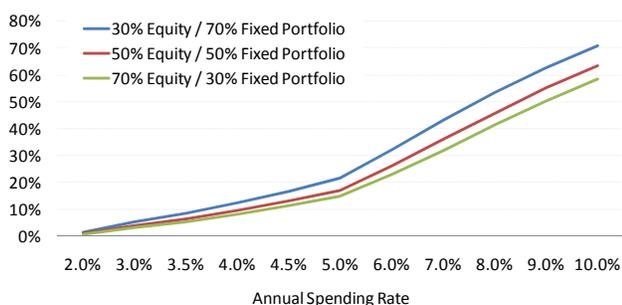
## RETIREMENT RUIN DUE TO LONGEVITY, SPENDING AND MARKET RISK

The five investment-related retirement income risks must be managed in concert. For example, decisions made to address market risk need to complement the spending decision. For that reason, it is helpful to see the interaction of market, spending and longevity risks on the probability of retirement ruin. The following charts are based on a formula developed by Moshe A. Milevsky that estimates the probability personal savings will be depleted.<sup>2</sup> The formula takes into account the annual spending rate, real portfolio return (i.e., net of inflation), portfolio volatility as measured by standard deviation and mortality rates. Retirement ruin for this exercise is defined as the probability the present value of future retiree distributions will be greater than the initial portfolio value. To simplify the modeling, spending and returns are calculated on a real (net of inflation) basis.

The first chart compares the probability of retirement ruin for a 65-year old retiree applying different spending rates based on three diversified portfolio mixes ranging from 30% equity to 70% equity.

Figure 3

Probability of Retirement Ruin with Increasing Spending Rates  
Portfolios with increasing levels of equity exposure

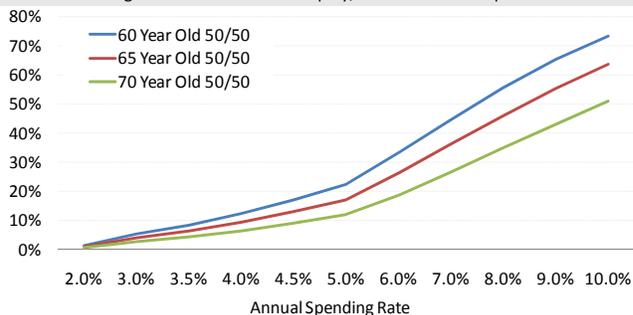


As might be expected, the probability of retirement ruin is greater as the spending rate increases. The probability of retirement ruin is less for portfolios with more equity exposure, although as demonstrated below, retirement income portfolios with higher equity allocations are more susceptible to the catastrophic impact of severe bear markets.

The next chart shows the probability of retirement ruin for retirees who commence retirement at different ages. Again, as might be expected, the younger the age that retirement begins the greater the likelihood of retirement ruin.

Figure 4

Probability of Retirement Ruin as Increasing Spending Rates  
Retirement age increases with a 50% equity/ 50% fixed income portfolio



While this type of modeling and other simulation work, such as Monte Carlo analysis is helpful in estimating the probability of retirement with income outcomes, it has a major drawback. The model captures the range of potential outcomes, but retirees generally only retire once. They don't get to start over if their particular retirement income experience has taken an undesirable turn.

A 65-year old retiree might look at this analysis and determine the 13% risk of retirement ruin that accompanies a 4.5% spending rate and a diversified pool of 50% equity and 50% fixed income is an acceptable risk. After all, the potential shortfall is far into the future and the simulated probability is low if annual spending rates are 4.5% or less. Unfortunately, in most cases, it is only an acceptable risk if the retiree's retirement income experience falls within the 87% of scenarios where the retiree doesn't deplete personal savings accounts. A 90-year old retiree with dwindling personal savings most likely has a different perspective on retirement ruin risk as the prospect of turning to family members, such as grown children, to provide financial support looms closer.

And it is not just 90 year olds that could see retirement ruin fast approaching. Bear markets can also wreak havoc on well laid retirement income plans. In the bear market of 2008, a diversified portfolio of 50% equity and 50% fixed income could have declined 28%. The 65-year old retiree who was spending 4.5% of personal savings in retirement would now be spending 6.3% of the lower portfolio value. With the increased spending rate, the probability of retirement ruin goes to 29% from 13%. The following table summarizes revised probability of ruin statistics for different asset allocation mixes assuming a bear market similar to the one experienced in 2008.

Figure 5

Probability or Retirement Ruin: 65-Year Old Retiree with Original 4.5% Spending Rate

	30% Equity 70% Fixed	50% Equity 50% Fixed	70% Equity 30% Fixed
Bear Market Portfolio Return	-19.2%	-28.0%	-36.8%
Current Spending Rate	4.5%	4.5%	4.5%
Revised Spending Rate	5.6%	6.3%	7.1%
Original Probability of Ruin	16.8%	13.1%	11.4%
Revised Probability of Ruin	27.9%	29.2%	33.3%

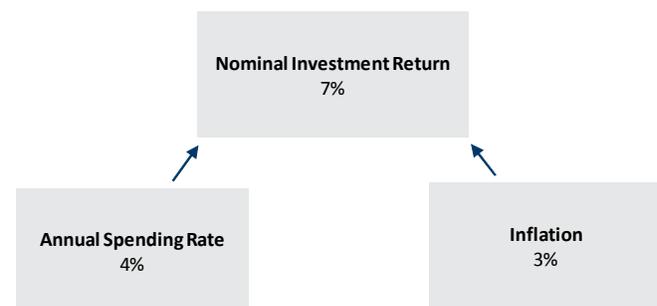
## RETIREMENT RUIN DUE TO INFLATION

Managing personal savings in order to take a systematic withdrawal while navigating market volatility, inflation and uncertain life expectancies is an extremely difficult task. The analysis above shows how the probability of retirement ruin can shift depending on the pattern of market returns. Retirement income planning was much simpler several decades ago when life expectancies were shorter and retirees were more dependent on guaranteed sources of income. Now, a married 65-year old retired couple must manage their personal savings so the assets will continue to provide retirement income for 30 years or more. For that 65-year old couple, there is a 50% probability that one spouse will live past age 90 and a 25% chance one spouse will live past age 93.<sup>3</sup> It is those lengthy life expectancies that make inflation risk such a paramount issue.

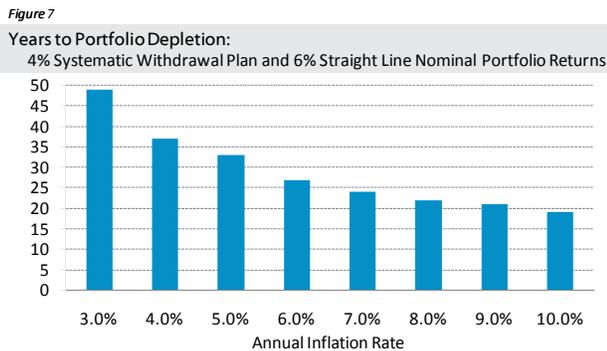
A typical retiree systematic withdrawal plan (SWP) consists of annually spending a certain percentage of the portfolio and then adjusting the spending amount each year by the rate of inflation. A retiree's portfolio would last into perpetuity as long as the nominal annualized investment return was equal to or greater than the spending rate plus inflation as shown in the diagram below.

Figure 6

Components of Nominal Investment Return



Even when the nominal return is 1% to 3% points less than the initial spending rate plus inflation, a retirement portfolio can last thirty or more years. The inflation risk is greatest when the spending rate plus inflation is 4% points or more than the nominal return on the portfolio. Such a scenario could occur during an extended period of hyperinflation or subpar investment returns, resulting in assets being depleted in 27 years or less. This situation would significantly increase the probability of retirement ruin. The following table shows how many years it would take to deplete a portfolio assuming a 4% spending rate, a 6% straight line nominal return and various inflation assumptions.



## REDUCING RETIREMENT RUIN RISK

We believe many retirees are underestimating the risk of depleting personal savings during retirement. The probabilities of retirement ruin can change dramatically based on market return patterns and inflation over a 35-year retirement window. Entering retirement knowing there is even a 10% probability of prematurely depleting personal savings when that is the primary source of retirement income is imprudent. There are too many unknowns that can potentially lead to a catastrophic outcome. Most retirees with homes wouldn't think of going without fire insurance, yet the probability of their house catching on fire over a 30-year period is only 1%, much less than the probability of retirement ruin for many retirees.<sup>4</sup>

Retirees can reduce their risk of retirement ruin if they convert more of their annual spending into guaranteed income sources so they can mitigate investment related risks and mimic the more secure retirement of older retirees. A 2004 survey showed retirees over the age of 85 received more than 80% of their income from guaranteed (i.e., annuitized sources) such as social security, defined benefit plans and private annuities. The same survey showed retirees 65 to 85 years old receive half their retirement income from annuitized sources. Yet baby boomers expect their portion of retirement income coming from annuitized sources to be 40% or less.<sup>5</sup>

## IMMEDIATE LIFETIME ANNUITIES

There is a straightforward, but significantly underutilized mechanism for converting a portion of personal savings into a guaranteed lifetime income stream. Retirees could purchase a single premium immediate annuity (SPIA).

At its simplest, an immediate annuity is a contract with an insurance company. A retiree gives the insurance company a lump sum (i.e., the premium) and the insurer promises to pay a specific periodic dollar amount, usually monthly, for the rest of the retiree's life and, depending on the contract, the lifetime of the surviving spouse. Annuities have been around since ancient Rome when contracts, known as annua, promised individuals a stream of payments for a fixed term, sometimes for life, in an exchange for an upfront payment. Single premium life annuities were available in the Middle Ages and have been available in the United States for over 200 years.<sup>6</sup>

With an immediate annuity, the retiree eliminates longevity risk, market risk and inflation risk (if an indexed annuity is purchased). An immediate annuity has an additional investment benefit. The annuity payout is higher than what could safely be earned investing given the uncertainty retirees have regarding their life expectancies. Safely, in this case, means without incurring losses. Annual immediate annuity payout rates of 8% or

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higher are common for a 65 year old retiree. That is guaranteed income. Of course, if someone knew they were going to die in the exact year that actuarial tables indicated the median person their age was expected to die, then they could also safely spend 8% or more a year. The challenge is retirees don't know how long they will live so as we saw above a 65-year old who spends 8% of their retirement savings annually has a greater than 40% probability of running out of money.

SPIAs are priced so the present value of the annuity payments approximately equals the premium paid for annuitants who lives to the median expected age. This is called the money's worth calculation. In practice, the present value of the annuity stream is slightly less than the annuity premium due to reserves for insurance company administrative costs, profit and the potential that the assumptions for life expectancies are too conservative due to mortality improvements.

The median 65-year old retiree who buys a SPIA is expected to live 19 years and die just before his or her 84th birthday. If that is the median, then half the 65-year old retirees are expected to die before their 84th birthday and half are expected to die after it. Those who die before their 84th birthday would not get their money's worth. The present value of the annuity payments could be significantly less than the premium paid. Conversely, the present value of annuity payments will be much greater than the premium paid for those 65-year olds who live well beyond their 84th birthday.

Most purchasers who buy an annuity do so to mitigate longevity risk because they believe they will live well beyond their 84th birthday. Those who live longer, partially benefit from the premiums paid by others who didn't live as long. This is no different from other types of insurance. The payout insurance companies make to policy holders who suffered a house fire comes partly from the premiums of policy holders whose homes

didn't burn. An immediate annuity is simply another type of insurance. In this case, it is longevity insurance. Surprisingly, very few retirees buy this longevity insurance. In 2007, there was only \$12.7 billion of single-premium immediate annuity sales<sup>7</sup> compared to \$4.7 trillion of assets held in Individual Retirement Accounts.<sup>8</sup>

There are several reasons the immediate annuity market is not as robust as it should be.

1. Concerns regarding loss of asset control. Funds used to purchase an immediate annuity belong to the insurance company. They cannot be left to heirs. Nor can they be tapped for unexpected expenses above and beyond the annual annuity payout. If the retiree dies suddenly, the money is gone. We've already seen why that is. Capital left by the departed is partially funding the annuity payments of the living. Insurance companies have tried to combat this loss of control fear by adding "enhancements" to annuities such as guaranteed payments to a beneficiary for a period of time after the annuitant and his or her surviving spouse pass away. The downside of these enhancements is they reduce the monthly annuity payment.
2. Fear the issuer will default or go bankrupt. While it is important to purchase an annuity from a highly rated insurance company, the risk of issuer default is low. Insurance companies are regulated by individual states who are responsible for making sure the insurance company has sufficient reserves to cover annuity payments. Many states require insurers to keep annuity pools separate from the insurer's other assets, including separate from the variable annuity assets which are higher risk due to their market exposure. This separation is often accomplished by establishing a separate legal entity for the annuity pool. If the parent company runs into financial difficulty, the parent will often sell their annuity business to another insurer. The state

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insurance office will oversee and approve these transactions. Finally, in a worst case scenario if the insurer defaults on the annuity payments there are state insurance guaranty pools that will step in and continue to make the annuity payments.

3. Overly complicated sales process. Plain vanilla immediate annuities are fairly straightforward. Unfortunately, their simplicity is often hidden by all the enhancements and available options that insurers have developed to spur higher annuity sales. Insurer compensation programs are often more lucrative for annuity products with enhancements.

## IMPLEMENTATION

Just as retirees protect against fire, theft and other risks by purchasing insurance, they should also protect against longevity and other retirement income risks by making sure the majority of their retirement income sources are guaranteed. Retirees whose primary sources of retirement income comes from personal savings should convert a portion of that savings to immediate annuities in order to reduce the risk of retirement ruin. Retirees who have access to a defined benefit plan have less of a need for immediate annuities.

Retirees considering annuitizing a portion of their savings need to consider:

1. The percentage of personal savings assets to contribute to the SPIA, and
2. The timing of when to purchase the SPIA.

The amount to commit to the annuity is dependent on the amount of guaranteed income desired. One approach is to commit sufficient assets to an annuity so the amount of annual income is equal to what would have been withdrawn as part of a systematic withdrawal plan.

For example, consider a 65-year old retired married couple whose only source of retirement income is \$20,000 of annual social security payments and a \$1 million IRA. The couple determines they need \$60,000 to cover their living expenses. Therefore, they would need to initially withdraw \$40,000 from their IRA and adjusted it over time for inflation.

The couple could set up a 4% systematic withdrawal plan and invest the IRA assets in a diversified asset allocation of 50% equity and 50% fixed income. This systematic withdrawal plan has a 90% probability of not depleting the personal savings assets during this couple's lifetimes. As we saw earlier, that 90% probability can change dramatically based on investment return experience as a result of bear markets or high inflation.

Alternatively, the couple could use 50% of the IRA funds to purchase immediate annuities with 100% survivorship benefits for the surviving spouse. A non-inflation index payout on one of these annuities would be approximately \$39,839 per year, very close to the initial 4% systematic withdrawal amount.<sup>9</sup> The couple could then use the remaining IRA assets to make cost of living adjustments on the annuity payment.

The required nominal rate of return earned on the remaining \$500,000 in IRA assets in order to make cost of living adjustments on annuity payments is lower than the required rate of return needed to sustain a systematic withdrawal plan. A rate of return of 2% + inflation is sufficient to meet cost of living adjustments for a 30-year period for annualized inflation rates under 7%. The lower required rate of return means the assets can be invested more conservatively.

The timing of when to purchase the SPIA is also important. SPIA payout rates are affected by interest rates and by the age of the annuitants. As interest rates rise, the payout rate insurance companies quote for a SPIA also climb. Likewise,

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the older the retiree is at the time the SPIA is purchased, the higher the payout rate. Consequently, it is important to consider interest rates, asset class valuations, expected returns and the age of the retiree when determining the timing and amount to be committed to a SPIA.

## CONCLUSION

Dividing personal savings assets between immediate annuities and an investment pool focused on making cost of living adjustments significantly reduces the risk retirees will run out of money. Such an approach, reduces market risk, longevity risk and inflation risk. By partially funding retirement with a SPIA, the personal savings portfolio can be invested more conservatively than a portfolio geared toward a systematic withdrawal plan. In addition, combining a SPIA with personal savings reduces loss of control fears because only a portion of the assets are paid to the insurance company. Retirees should consider the premium paid to purchase an immediate annuity as longevity insurance or as simply funding a defined benefit plan.

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