Systematic Withdrawal Programs: Unsafe at Any Speed

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Abstract: *This paper presents a unique perspective on the depletion risk of a retirement portfolio under systematic withdrawal programs (SWPs) along five dimensions: the initial withdrawal rate, the rate of inflation of subsequent withdrawals, the percentage of allocation of the portfolio to equities, the retirement period, and the total fees underlying the portfolio. The analysis demonstrates that traditional SWPs are unsafe at any practical speed and expose retirees to unacceptable depletion risk. In addition, there is also a significant risk that such programs will fail to preserve a reasonable legacy for heirs. The paper suggests alternative solutions that address these shortcomings.*

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Introduction

The financial arena is replete with examples in which Americans have fundamental misperceptions about and lack a basic understanding of retirement savings and accumulation.[1] Now, as millions of baby boomers enter the retirement phase where they will responsible for converting their accumulated retirement savings into a reliable stream of income to maintain their dignity and lifestyle in retirement, it is increasingly clear that there are also fundamental misperceptions about the dynamics and issues involved in retirement distribution. This is all the more alarming because it may be very difficult to recover from financial mistakes in retirement.

One area where there may be a serious lack of understanding is the popular method of converting a retirement asset portfolio into income—the traditional systematic withdrawal program (SWP).

This paper demonstrates that the SWP exposes retired investors to an unacceptable trade-off between generating adequate income for the potential retirement horizon and the risk of fully (or substantially) depleting those assets over that horizon—that these programs are "unsafe at any speed."[2]

In addition, the analysis underscores some of the paradoxes at play within the arena of distribution. In particular, according to surveys, the many investors who engage in SWPs as the dominant method of converting retirement assets into income do so in the belief that this approach will help to preserve their retirement assets at a low cost. The paradox demonstrated in this paper is that the reality is exactly the opposite of this mistaken notion—there may be an unacceptably high probability that a disciplined program of systematic withdrawals from retirement assets is more likely to defeat the objective of preserving those assets than it is to preserve them over the investor's potential lifetime.

Yet equally intriguing, many advisors recommend SWPs (traditional SWPs and variations on the theme), perhaps in the belief that their investment management knowledge and skills are sufficient to successfully address the risks and trade-offs presented by retirement distribution dynamics. According to a LIMRA survey, almost 80% of advisors establish SWPs to create retirement income for their clients.[3] Unfortunately, some advisors may be relying on their finely honed and even superior investment and risk management skills developed for the dynamics of accumulating assets. These wealth management skills alone may not be particularly effective when developing and managing periodic distributions from an asset portfolio particularly due to the paradoxes involved in distribution dynamics. Relying on wealth management skills may lead to serious misperceptions about distribution management and less-than-effective results for clients.

Finally, investment management institutions have begun to assimilate systematic withdrawal methods into their investment management products and programs designed for retirement. These can be thought of as nontraditional, sophisticated variations of the basic traditional withdrawal model and imbed investment management (asset allocation) methods and advice. The offerings include pre- and post-target-date distribution glide paths (a dynamic asset allocation method) within a mutual fund structure, managed payout structures, income funds, and endowment funding structures. However, these offerings though sophisticated, often fail to fully address the fundamental risks and trade-offs involved in developing a sensible, practical retirement program—will the retiree be afforded a reliable, inflation-adjusted income stream over his/her entire retirement lifetime while leaving sufficient assets for heirs? In many cases, the answer is no, or there remains a great degree of uncertainty involved around each of the elements due to the fact that longevity risk is not eliminated from these programs.

The Traditional SWP Defined

What is a traditional SWP? The traditional program starts with a stated initial percentage withdrawal rate that defines the annual dollar amount of the withdrawal to be taken from the assets in the first year. Subsequent withdrawals are completely unrelated to the then value of the asset portfolio. Instead, the dollar amount of each subsequent annual withdrawal is simply a function of the previous year's dollar amount of withdrawal. Typically, an annual increase factor is applied to the dollar amount of the withdrawal in a given year to determine the dollar amount of the next year's withdrawal amount.

For example, let us assume that an SWP is to be established on a retirement portfolio of $1,000,000. The initial withdrawal rate is 6% and the annual increase rate (or inflation offset factor) is 3%. Thus, the initial annual withdrawal is 6% of $1,000,000 or $60,000 in the first year. This program is called a "6% SWP."

In the 2nd year, the amount to be withdrawn is increased by the 3% annual increase factor—this withdrawal would therefore be $61,800 (i.e. $60,000 multiplied by 1.03). The withdrawals in the 3rd and 4th years would be $63,654 (i.e. $61,800 multiplied by 1.03) and $65,563.62 (i.e. $63,654 multiplied by 1.03). The withdrawal in each subsequent year thereafter takes the previous year's withdrawal amount and multiplies it by 1.03 (1 plus the annual increase factor).

There are several things to note about how the traditional withdrawal program works in practice:

- The withdrawals are determined annually in advance but can be taken in monthly installments. In the example above, the $61,800 annual withdrawal in the 2nd year of the program could be taken in monthly installments of $5,150. Alternatively, the withdrawals could be taken in quarterly or semiannual installments as well. There is no requirement for a particular periodicity of withdrawals.
- The annual increase factor (3% used in the example above) is meant to be an adjustment to help offset inflation. Since inflation may vary from one year to the next, the annual increase factor could also be changed to reflect whatever inflationary increase was experienced in the expenses of the retiree. For example, if the rate of inflation in the first year

were 10% rather than 3%, the annual withdrawal in the second year would be $66,000 (i.e., $60,000 multiplied by 1.10).

- The withdrawal rate used to define the SWP is a percentage that is applied to the initial asset portfolio only. Under the SWP, except by mere coincidence, there is absolutely no relationship between withdrawals after the initial withdrawal and the underlying portfolio value at the time subsequent withdrawals are taken. This should be a very clear indicator to the astute investor that suggests a potentially serious problem with such programs. It does not take an academic analysis to observe that under a traditional SWP, the implied withdrawal rate in subsequent years may be considerably different than the initial withdrawal rate that was used to define the program. This issue will be addressed in additional detail later in the paper in the "Fundamental Dynamics Driving Depletion Risk" section.
- SWPs assume structure and discipline. For example, while all or most of an asset portfolio may be accessible for withdrawal in one lump sum at any given time, the program assumes that only the amount of withdrawal described by the SWP is withdrawn by the retiree. The temptation to access available retirement assets in an undisciplined fashion is well documented in practice; retirees may withdraw more of the retirement assets than prescribed by the regimen of the SWP, for example, to buy the sailboat or take the long dreamed of around-the-world trip. More sympathetically, such unplanned withdrawals may be forced due to unforeseen circumstances, e.g., a large medical expense. This of course would decrease the time to depletion or would reduce the level of withdrawals that could be generated, all other things constant. However, we will ignore the behavioral dynamics in assessing the degree of risk exposure, but we will not ignore them as a risk attribute when we compare SWPs to the alternatives.

Methodology and Assumptions

The risk attributes we seek to measure with an SWP are (1) the probability of depletion over a defined horizon, and (2) the probability that the assets remaining will be less than the starting portfolio, that is, that there will be a legacy shortfall. We contend that for a retiree, using the retirement assets to withdraw adequate income for life and leaving an adequate legacy are competing objectives in that achieving one of these objectives must come at the expense of the other objective. The paper explores these conflicting goals because many retirees often want to achieve both in practice and many advisors want to deliver both.

"Depletion" in the context of the analysis means fully depleting the asset portfolio (it is drawn down to zero at or before the end of the retirement horizon). We assume that a depletion risk of 10% (1 in 10 chance of depletion) or less is tolerable. In reality, a 1 in 10 chance of depletion may be quite high since depletion is a devastating outcome, but we will assume that many retirees may have to tolerate such an exposure (or even higher) in order to generate meaningful levels of retirement income.

"Legacy shortfall" in this context means that the remaining portfolio is partially depleted, and the assets left at the end of the retirement period are less than the assets on hand at the start of the retirement period. We propose that leaving a legacy of less than the starting level of assets is equivalent to leaving an inadequate legacy. Clearly, leaving an inadequate legacy would not be as devastating as fully depleting the portfolio while still alive. In fact, some retirees may be indifferent to the legacy objective. Thus, in the analysis that follows, the reader should assume that even for an investor for whom the legacy objective is important, there may be a greater tolerance for "shortfall" risk. For example, a 33% (or 1 in 3) chance of shortfall may be tolerable.

The depletion and legacy shortfall risk measures used have certain benefits for the purposes of the analysis and conclusions presented in this paper:

- They are simple and thus easy to understand.
- The SWP program itself incorporates, by definition, a form of inflation adjustment (the annual increase factor), so there is no need for a separate measure to determine the risk that the program fails to keep pace with inflation.
- The legacy shortfall measure addresses a key retirement objective—leaving a legacy. However, since

leaving a legacy may not be a high priority for some investors, the results for this measure can be ignored without detracting from the main premise of the paper.

The measures used have some shortcomings as well, but these may be acceptable given the purpose and objectives of the paper.

First, the inflation used in the SWP is a constant rate. In reality, inflation is dynamic. However, it will be shown that even for relatively modest levels of constant inflationary increases in the systematic withdrawals, the risks of depletion can be substantial. Clearly, if the portfolio is depleted, it can no longer keep up with inflation since no further withdrawals of any amount can be taken after the point of depletion.

Second, the depletion measure is full depletion of the asset portfolio. In practice, this may significantly understate the risk exposure of an SWP because the measure counts a scenario that may otherwise end with an inadequate level of remaining assets (e.g., the remaining asset at the end of the retirement horizon is $100 or $1000) as a successful outcome. While an ending asset of $0 is clearly a failure, there could be many scenarios where the remaining assets are clearly inadequate (e.g., for leaving a legacy, meeting end-of-life expenses, etc.) but are not included in the failure rate. However, the legacy shortfall exposure is separately measured and helps to add the additional context of partial depletion.

Third, the measures are point-in-time measures (end of retirement horizon) and do not address the potential need for maintaining adequate liquidity (access to assets) across the entire retirement horizon. It is possible that there may be scenarios where a minimum desired level of liquidity is not achieved at all points over the retirement horizon. The analysis does not explicitly measure this type of consequence.

Fourth, longevity risk is not explicitly measured, but it is readily implied. For the purposes of this paper, the analysis includes measuring depletion risk over a range of retirement horizons, which include horizons that represent reasonable potential lifetimes for a retiree aged 65. For example, the horizons will extend as far as 30-40 years over which depletion risk is examined. While 30-40 years may be considered a relatively long retirement horizon for a 65-year-old, based on the following this is, in fact, a very reasonable period over which to assess the depletion risk exposures while taking longevity into account:

- According to the Society of Actuaries, under the A2000 mortality table, a 65-year-old male has a life expectancy of about 20 years, but this means that half the 65-year-olds are expected to live beyond that age.
- Life expectancy is not a fixed age or time frame; as a retiree ages, his/her life expectancy age increases. Thus, according to the same mortality table (A2000), while a 65-year-old male has a life expectancy age of 85, an 85-year-old male (i.e. if the 65-year old had lived for 20 years) has a life expectancy age of 93 (meaning half the 85-year-olds can expect to live beyond age 93).
- In retirement, the "retiree unit" may not be a single individual but more often is a married couple. It is well documented that the life expectancy age of the last survivor of a couple is considerably longer than the life expectancy age of either individual. For example, for a couple aged 65, there is a more than 1 in 3 chance that at least one of the couple could survive for 30 years, and a more than 1 in 10 chance that at least one of them could survive for 40 years, assuming the same A2000 mortality table.
- Longevity risk is the perhaps the most insidious in retirement. Investors may vastly underestimate how long they (or the last survivor of a couple) may survive in retirement, but the financial impact of the underestimation could be most devastating.

The methodology used to generate the probability distributions for depletion and shortfall risks is a Monte Carlo model. This model assumes only two asset classes—equities and bonds—and combines them in various degrees. For the equity class, the model assumes the historical averages for total return and volatility of the stock and bond markets over the period 1927 to 2007. The average historical return for equities used in the model is 11.8%, and for bonds it is 6%. The model uses 5,000 randomly generated scenarios to represent the behavior of a hypothetical asset portfolio.

It is important to note that the period from 2008-2009, which includes the recent severe bear market, is not incorporated into the analysis. Doing so would cause the results (depletion risk and legacy shortfall risk) to be elevated due to the lower yields and higher volatilities that would then have to be reflected in the model. This period was excluded in order not to appear to unfairly bias the results; this bear market was considered to be a "black swan" or once-in-a-generation event even though, technically, it would not have been statistically inappropriate to include this period.

The absence from the model of other classes of assets beyond domestic stocks and bonds and other refinements within asset classes (e.g., small-cap, large-cap, international, etc.) is not problematic for the purpose of this analysis as it will be shown that the asset allocation, while it is a factor, is not the critical driver of depletion or legacy shortfall risks (except for allocations that are overweighted toward bonds). This is a very revealing and provocative result since many withdrawal programs (traditional and nontraditional) and the imbedded advice (asset allocation and withdrawal rates) are predominantly focused on asset allocation and investment methodologies for managing the risks involved in such retirement solutions. It will be shown that such a focus causes such programs to fall seriously short of providing a practical and reliable solution in terms of addressing longevity risk.

Finally, the impact of income and other taxes is not considered. Taxes and the effect of taxes on after-tax retirement income can be a very complex element given the different tax treatment of different tax qualification, the sequence in which assets may be liquidated by tax qualification, minimum distribution rules, and other factors. In other words, by ignoring taxes, the analysis implies that we are considering all amounts withdrawn as pretax amounts and that the ongoing potential tax liability of the portfolio is deferred. This tax deferral is a reasonable assumption since over a third of baby boomer financial assets are accumulated within tax-deferred retirement plans such as IRA, 401(k), and 403(b) programs,[4] and such tax deferral can be maintained by rolling over the accumulated balances into a tax-deferred IRA.

Analysis of Depletion and Legacy Shortfall Risks

We now look at the depletion and legacy shortfall risks to which a retirement portfolio is exposed under the regime of an SWP along five dimensions:

1. Initial withdrawal rate (3%–10%)
2. Percentage of allocation of the portfolio to equities (0%–100%)
3. Annual increase rate on subsequent withdrawals (0%–5%)
4. Retirement period (10–40 years)
5. Total fees underlying the portfolio (50–300 bps)

We examine each variable, one at a time. Since there are multiple dimensions of variables involved, it means that when examining a particular variable, the other four variables must be kept constant at some predetermined level. These predetermined levels are specified for each variable and are meant to be representative of a reasonable starting point. The variable being analyzed will then be modified while the others are kept constant.

Although there may be codependencies among variables, this approach will allow us to obtain deep insights into what drives the risks underlying each particular variable. Codependencies are also analyzed wherever they meaningfully increased the insights into the risks. In these cases, the analysis will show two variables at once. Starting values for the 5 variables are:

- Withdrawal rate: 5%
- Percentage allocation to equities: 50%
- Annual increase rate on subsequent withdrawals: 3%
- Retirement period/time horizon: 25 years
- Annual fees on portfolio—equities: 100 bps (1%); bonds: 60 bps (0.60%)

Depletion and Legacy Shortfall by Initial Withdrawal Rate

Table 1 shows the risk of portfolio depletion and legacy shortfall as we vary the withdrawal rate from 3% to 10%. For example, at a 5% initial withdrawal rate, there is a 17% chance of depletion. The percentage allocation to equities is 50%; the annual increase in subsequent withdrawals is 3%; the retirement time horizon is 25 years; and annual fees are 100 bps (equities) and 60 bps (bonds) respectively.

The key observation here is that both the depletion risk and especially the legacy shortfall risk rise in a nonlinear fashion as withdrawal rates increase. In other words, the risks are very sensitive to the level of withdrawals, all other factors constant. It is only for modest withdrawal rates under 5% that the risk of depletion appears to be within the parameters of risk tolerance and that there is a reasonable chance of leaving a meaningful legacy.

Depletion and Legacy Shortfall by Percentage Allocation to Equities

What happens if we change the allocation to equities? In Table 2, we vary the allocation to equities from 0% to 100%. The withdrawal rate is 5%; the annual increase in subsequent withdrawals is 3%; the retirement time horizon is 25 years; and annual fees are 100 bps (equities) and 60 bps (bonds) respectively.

In this case, as the allocation to equities declines below 50% (or conversely, as the allocation to bonds increases above 50%), the risks of both depletion and legacy shortfall increase dramatically. For example, there may be a 1 in 2 chance of depletion and a near certainty of legacy shortfall with a very conservative portfolio (100% bonds). What might explain this? The reason is that as the allocation to bonds increases, the likelihood that the portfolio can earn sufficient returns to cover the 5% withdrawals, inflationary increases on the withdrawals, and portfolio fees is reduced.

However, as the allocation to equities increases above 50%, the depletion risk does not conversely decline dramatically nor is there a significant reduction in legacy shortfall risk. Instead, the risks remain relatively flat and are somewhat high (in the 20% range) for depletion and quite high (in the 35–40%) range for legacy shortfall. This is a paradoxical result—as the allocation to equities increases, the average yield on the portfolio increases, and one might expect that the likelihood the portfolio would earn sufficient returns to cover the 5% withdrawals, inflationary increases on the withdrawals, and portfolio fees is increased. The analysis shows that this is not the case.

What might explain this? The reason for the observed result is that as the equity allocation—and thus the average portfolio return—increases, the volatility of those returns also increases and, in turn, increases the exposure of the portfolio to adverse sequences of returns. It is the sequence of returns that causes the actual realized returns on the portfolio to perform poorly when distributions are taken from the portfolio. In other words, when there are unrealized capital losses on the portfolio, e.g., in a down market scenario, liquidating a portion of the portfolio to realize the withdrawals needed causes the unrealized losses to become realized at an inopportune time, and the portfolio's return is reduced by the realized capital losses in addition to the withdrawals, inflationary increases, and fees. As volatility increases with higher equity allocations, the likelihood of down market scenarios and thus realized capital losses increases commensurately.

This paradox—that increasing the equity alloca-

TABLE 1

Initial Withdrawal Rate	Percent Depletion Risk	Legacy Shortfall Risk
3%	0	8
4%	4	17
5%	17	41
6%	39	60
7%	62	77
8%	79	89
9%	89	94
10%	96	97

TABLE 2

Allocation to Equities	Percent Depletion Risk	Legacy Shortfall Risk
0%	54	87
10%	30	77
20%	23	64
30%	18	55
40%	17	46
50%	17	41
60%	18	38
70%	18	35
80%	18	35
90%	20	34
100%	22	34

tion (beyond a balanced portfolio) does not reward the investor for taking increased volatility risk—is a distribution dynamic that is exactly the opposite of what advisors have been taught about investment management in the accumulation phase: that there is a potentially larger reward (i.e. potentially higher average portfolio performance and thus larger ending portfolio values) for taking more risk.

This result also suggests that SWPs create a "catch-22" situation—allocate too much to bonds and the risk of depletion increases because returns may be inadequate, but allocate too much to equities and obtain little or no incremental reward (lower depletion rates and larger legacies) for the additional risk exposure to potential losses on the portfolio.

TABLE 3

Initial Withdrawal Rate	Allocation to Equities					
	0%	20%	40%	60%	80%	100%
3%	0	0	0	1	0	4
5%	54	23	17	18	18	22
7%	96	86	69	55	49	53
9%	100	100	94	85	76	70

TABLE 4

Initial Withdrawal Rate	Allocation to Equities					
	0%	20%	40%	60%	80%	100%
3%	25	10	7	9	11	13
5%	87	65	46	38	35	34
7%	100	96	84	71	62	56
9%	100	100	98	91	82	75

TABLE 5

Annual Increase Rate	Percent Depletion Risk	Legacy Shortfall Risk
0%	2	17
1%	5	23
2%	9	31
3%	17	41
4%	28	51
5%	40	62

Depletion and Legacy Shortfall by Percentage Allocation to Equities and Withdrawal Rate

We now expand on the analysis by looking at the behavior of depletion risk as both the withdrawal rate and the allocation-to-equities change. The annual increase in subsequent withdrawals is 3%; the retirement time horizon is 25 years; and annual fees are 100 bps (equities) and 60 bps (bonds) respectively. Table 3 shows the depletion risk percentages.

Table 4 shows the legacy shortfall risk percentage. The result shows that withdrawal rates under 5% may provide acceptable levels of risk over a 25-year retirement horizon regardless of asset allocation.

Withdrawal rates of 5% or higher expose investors to substantial depletion and shortfall risks regardless of asset allocation. As withdrawal rates increase, depletion and legacy shortfall risks dramatically escalate for all asset allocation mixes. Weighting allocations to equities over bonds helps to reduce risk, but not to acceptable levels if withdrawals rates are 5% or higher. However, for a given withdrawal rate, the risks are relatively insensitive to asset allocation mix (with the exception of relatively high allocations to bonds).

Depletion and Legacy Shortfall by Annual Increase Rate

Inflation is a critical financial exposure in retirement. Even a relatively low level of inflation can have serious effects on purchasing power over a retirement horizon that could last two decades or longer. For example, a 3% rate of inflation over 20 years can cut purchasing power in half. The annual increase rate in the SWP is meant to help offset inflation. Historical inflation in the consumer price index has averaged around 3%.[5] However, the goods and services that retirees purchase may inflate at higher rates than the goods and services represented by the CPI.[6]

The annual increase used in the analysis of the other variables is 3%. But what if inflation is different? What is the impact on depletion and shortfall risks? Table 5 shows the impact of annual increase rates that range from 0% (no increase in subsequent withdrawals) to 5%. The withdrawal rate used is 5%; the allocation to equities is 50%; the retirement time horizon is 25 years; and annual fees are 100 bps (equities) and 60 bps (bonds) respectively.

The results suggest that as the annual increase rates increase, the shortfall and depletion risks increase to intolerably high levels. However, if withdrawals are not increased to offset inflation, then in order to reduce these risks, retirees risk significant exposure to loss of purchasing power over the retirement horizon—an unwelcome catch-22.

Depletion and Legacy Shortfall by Length of Retirement Period and Withdrawal Rate

In the earlier tables presented, the retirement period assumed was 25 years. But one of the significant risks faced by retirees, especially retired couples, is longevity risk—the chance that they could live for extended periods in retirement. What would be the impact on depletion risk as the length of the retirement period changes, especially as it increases? The annual increase in subsequent withdrawals is 3%; the allocation to equities is 50%; and annual fees are 100 bps (equities) and 60 bps (bonds) respectively. Table 6 shows the results for depletion risk.

Table 7 shows the results for legacy shortfall risk. The results suggest that longevity in retirement can drive the depletion and legacy shortfall risks to intolerably high levels, even for relatively low withdrawal rates.

Depletion and Legacy Shortfall by Level of Annual Fees

Next we examine the impact of total fees on depletion risk. We vary the level of fees assessed on the equity allocation of the portfolio from 50 basis points (0.50%) to 300 basis points. The fees on the bond allocation are assumed to be 40 basis points (0.40%) less than the fees on the equity allocation. For example, if the annual fees assessed on the equity allocation are 300 bps (3.00%), then the fees on the bond allocation are 260 bps (2.60%). Total annual fees could potentially rise to such levels when under wrap accounts or when the asset portfolio is within an insurance program. Table 8 shows the impact of fees. The withdrawal rate used is 5%; the annual increase in subsequent withdrawals is 3%; the allocation to equities is 50%; and the retirement time horizon is 25 years.

The results suggest that depletion and legacy shortfall risks are sensitive to the level of fees but increase at a more linear pace rather than the pronounced increase observed for some other variables. This is because fees are a percentage of the portfolio rather than a fixed dollar amount, so they do not have as pronounced an impact as changes in the withdrawal rate. Nevertheless, it is clear that for all but the lowest level of fees, both depletion and shortfall risks rise to substantial levels as the level of fees rises. The reason is that fees reduce the effective yields on the portfolio.

TABLE 6

Initial Withdrawal Rate	Retirement Horizon (years) 10	15	20	25	30	35	40
3%	0	0	0	0	1	3	4
4%	0	0	1	4	10	15	20
5%	0	0	6	17	28	37	44
6%	0	3	20	39	52	60	64
7%	0	14	43	62	74	80	84
8%	1	30	63	79	86	90	92
9%	5	52	80	89	94	96	97
10%	14	69	90	96	98	98	99

TABLE 7

Initial Withdrawal Rate	Retirement Horizon (years) 10	15	20	25	30	35	40
3%	13	9	8	8	8	8	9
4%	11	19	19	17	23	25	27
5%	32	34	38	41	45	49	52
6%	45	50	55	60	66	70	72
7%	59	66	73	77	81	84	86
8%	70	79	85	89	92	93	94
9%	80	87	92	94	96	97	98
10%	88	93	96	97	98	99	99

TABLE 8

Annual Portfolio Fees (bps)	Percent Depletion Risk	Legacy Shortfall Risk
50/10	12	33
100/60	17	41
150/110	22	48
200/160	27	55
250/210	33	63
300/260	41	70

Summary of Key Insights into Risks Presented by SWPs

The previous analysis provides intriguing insights into the dynamics of depletion risk and legacy shortfall risk under SWPs. In summary:

- Except for relatively low withdrawal rates, both the depletion risk and the legacy shortfall risk under an SWP can be quite substantial. In order to keep the risks within a tolerable range, it appears that the initial withdrawal rate should not be higher than 5%. The trade-off presented by low withdrawal rates is whether the SWP will provide an adequate level of income to maintain the investor's standard of living in retirement.
- Depletion risk and legacy shortfall risk are quite sensitive to the annual rate of increase applied to subsequent withdrawals. Thus, when there are periods of relatively high inflation, the investor is faced with a quandary: keep the annual increases at levels that do not fully offset inflation and lose purchasing power in retirement, or maintain purchasing power and dramatically increase the risks of depleting the retirement assets and leaving an inadequate legacy?
- Longevity risk—the risk that the investor (or the last survivor of the investor and spouse) will live for an extended period in retirement—dramatically compounds the risks even for relatively low levels of withdrawal. In such cases, it appears that the initial withdrawal rate should be less than 4%, a level of withdrawal that is well below what has been touted in the popular press as the "safe" withdrawal rate.
- Relatively high allocation to bonds—a conservative investment posture in the accumulation context—dramatically increases both depletion risk and legacy shortfall risk in the distribution phase. This is a paradox: a lower tolerance for investment risk creates a dramatically high risk that the portfolio will in fact be fully or partially lost. The commonly understood paradigm of investment risk in the accumulation phase suggests an investor with a low tolerance for investment risk can expect low but stable returns, that is, a low likelihood of loss of principal. In the distribution phase, the exact opposite is true.
- While higher equity allocations create lower depletion and shortfall risks than higher bond allocations, it does not appear that there is any incremental reward for taking on more volatility risk to achieve higher potential yields; the depletion risk is not significantly reduced by higher equity exposure once the equity allocation exceeds that of a balanced portfolio. Furthermore, the likelihood of growing the portfolio and leaving a significant legacy is not aided by higher equity allocations. This is another paradox of the SWP.
- Investors should not necessarily select an asset allocation in the distribution phase that is consistent with their risk tolerance in the accumulation phase. The more conservative the investment allocation, the higher the risk of depletion or shortfall. Conservative investors should consider taking equity exposure of a balanced portfolio to reduce their risks of portfolio loss in the distribution phase. Conversely, investors who have a high tolerance for investment risk are not adequately rewarded for taking on more investment risk in the distribution phase and should thus consider equity exposure only up to that of a balanced portfolio.
- Investors utilizing SWPs for generating income should seek to keep all fees at the lowest possible level in order to maximize the withdrawal rate that can be achieved while keeping depletion risk within a tolerable range.

Fundamental Dynamics Driving Depletion Risk

What is the underlying fundamental issue at play that drives depletion risk? One can examine the analytical results presented and infer that the variables analyzed are all drivers of depletion risk, and the root cause is sequence of returns experienced over the retirement horizon. But why is that the case?

There is a more fundamental issue at play. Under the traditional SWP, the dollar amount of the withdrawals taken is completely unrelated to the value of the underlying portfolio. The dollar amount of withdrawals is either level or increasing. However, the value of the portfolio will be reduced by the withdrawals taken and, furthermore, will be increased or reduced by investment gains and losses on the portfolio; the higher the equity allocation and thus the higher the volatility of the portfolio, the more pronounced the swings in portfolio value.[7]

The effective ongoing withdrawal rate as a percentage of the value of the portfolio will vary as the value of the portfolio moves up and down. In particular, when the value of the portfolio moves down (as in a bear market), the "effective" withdrawal rate at the time of the withdrawal can become extraordinarily high.

Let us look at a simple, hypothetical example of a 5% SWP with a 3% annual increase from a portfolio earning a net of 7% every year after fees. Assume that the initial value of the portfolio is $1,000,000. Withdrawals start at $50,000 a year and increase at a rate of 3% per year. After 20 years, the value of the portfolio increased by investment gains and reduced for all withdrawals is $1,109,656. However, the annual withdrawal that will be made at the start of the 21st year is now $90,306 (i.e. the initial $50,000 inflated at 3% per year for 20 years). At the start of the 21st year, that withdrawal would be 8.1% of the portfolio (i.e. $90,306 divided by $1,109,656). This is much larger than the initial 5% withdrawal rate. In this example, the portfolio experienced a constant net 7% bull market over the 20-year period. At a 7% annual pace, an accumulation portfolio would have almost quadrupled!

Now let us further assume that at the start of the 21st year, just before the withdrawal of $90,306, there is an immediate drop in the portfolio value of 20%. The portfolio thus drops to $887,725 (80% of $1,109,656). The withdrawal to be taken represents an effective withdrawal from the portfolio of 10.2% ($90,306 divided by $887,725). As shown in the analysis, it would be all but certain that this portfolio under this withdrawal schedule would be depleted over the subsequent 20-year period from the 21st year forward.

This example also demonstrates that it is not simply a matter of market downturns within 5–10 years of retirement that present the primary risk of experiencing premature depletion. That appears to be more marketing fiction than analytical fact; dramatic risk exposures can occur well outside of those time periods. The investor should be ever vigilant and should not become complacent if his/her retirement portfolio has survived or even grown over the so-called 10-year "danger zone."

When thought of in these terms, and despite the paradoxes involved, these conclusions regarding the fundamental dynamics driving depletion risk are quite logical and perhaps even intuitive; they require no in-depth analysis to infer. The analysis simply supports and confirms what otherwise should be intuitively obvious.

This simple example suggests that rather than leave the withdrawals unrelated to the value of the underlying portfolio, perhaps the withdrawal rate should be periodically reviewed and reset (e.g., quarterly) in light of the then-current portfolio value and the assumed remaining time horizon. This suggestion is further developed into one of the four alternative approaches discussed next.

Four Alternative Approaches

While traditional SWPs can provide a stable stream of inflation-adjusted income in retirement, they fall short in many important areas that are critical to the needs of investors in retirement:

- Longevity/Risk of Depletion—No investor can predict how long he/she will need his/her income streams to last since the date of death is indeterminate. The analysis demonstrates that the longer an investor lives, the more dramatic the risk of depletion except for untenably low withdrawal rates. SWPs do not address longevity risk, and there is considerable uncertainty involved in how long the income stream can be relied upon.
- Inflation—The greater the level of inflation that emerges over the investor's retirement horizon, the greater the likelihood that the SWP will eventually fail. Failure rates can be quite dramatic, except for untenably low withdrawal rates.
- Adequacy of Income—In order to maintain depletion risks within tolerable levels, it is necessary to hold the SWP withdrawal rate to levels of 4% or lower. Thus, an SWP is a highly inefficient method for converting retirement assets into income; substantial assets are required to generate a desired level of income.
- Liquidity/Legacy—Since there is a relatively high degree of depletion risk associated with SWPs,

there is a commensurately high likelihood that little or nothing will be left for legacy and/or other liquidity needs.

- Portfolio Growth/Reward for Equity Market Risk—The aggressive investor is not rewarded with incremental potential growth of the retirement assets for taking additional equity market risk under an SWP. The sequence of returns and the higher volatility associated with equities may lead to a compounding of capital losses that destroy portfolio values when withdrawals are taken systematically from a portfolio. The withdrawals themselves and fees on the portfolio also consume the portfolio. An SWP is thus a highly inefficient mechanism for effecting portfolio growth.

The natural question is whether any or all of these critical shortcomings can be addressed and, if so, how? Are there other approaches to converting retirement assets into retirement income in a manner that is more effective in addressing some or all of these critical needs? And what are the trade-offs, if any? The following discourse outlines four powerful alternatives, along with their pros and cons.

An Improved Systematic Withdrawal Program: Variable-Dollar Systematic Withdrawals

In the section "Fundamental Dynamics Driving Depletion Risk," it was observed that the issue at the core of the inefficiencies of an SWP is that the withdrawals themselves are a series of fixed-dollar withdrawals bearing no relationship whatsoever to the underlying portfolio (except for the initial withdrawal). Thus, an immediate step that can be taken to vastly improve the performance of an SWP is to make each withdrawal a fixed percentage of the underlying portfolio value. For example, instead of setting the withdrawal percentage as the determinant of the initial withdrawal only, a set percentage can be applied to the portfolio values at the time of each withdrawal.

In a variation on this theme, the withdrawal rate itself can be reset based on the presumed remaining time horizon of the retirement period. For example, if a 65-year-old investor presumes that his/her remaining lifetime over which to make withdrawals is 35 years (assuming he/she will live to age 100), the investor may start with a withdrawal rate of 3% in order to reduce depletion risk to a tolerable level. However, if this investor survived to age 85 (20 years later), the remaining horizon is now presumed to be 15 years and he/she could now be taking withdrawals at a rate of, say, 6%.

The primary benefit of making the withdrawals a percentage of the underlying portfolio value is substantial; the portfolio can never be depleted since only a small percentage of the portfolio is to be withdrawn. Withdrawal risk is thus eliminated (ignoring the potential for the value of underlying security holdings to go to zero due to the default or bankruptcy of the issuers of stocks or bonds). This approach also reduces the heavy risk penalty suffered by overweighting to bonds as well as the lack of reward for overweighting to equities. Unlike the traditional SWP, this approach does not require the investor to select an asset allocation strategy that is inconsistent with his/her tolerance for volatility risk.

There are several trade-offs, but as discussed below, many of the trade-offs are intuitive—what should be expected—and can be appropriately managed.

First, since the withdrawals will vary with the ups and downs of the portfolio, the income stream will have the same volatility as the underlying portfolio. At first glance, this may sound adverse. But this is actually helpful because it forces the investor to assess his/her degree of tolerance for income volatility and choose an asset allocation consistent with that risk tolerance.

Second, there is no direct connection between the withdrawals and inflation. Withdrawals bear no connection to each other except via the performance of the underlying portfolio net of withdrawals. Thus, to keep pace with inflation, the net performance of the underlying portfolio must cover the prior withdrawal, plus inflation on that withdrawal. For example, assume the portfolio is currently $1,000,000, withdrawals are 5% of the portfolio, and inflation is currently 4%. The current withdrawal would be $50,000 (5% of 1,000,000). If the next withdrawal must keep up with the 4% inflation rate, it would have to be $52,000 ($50,000 multiplied by 1.04). The portfolio would thus have to grow to $1,040,000 after the current $50,000 withdrawal is accounted for. The net performance of the portfolio would have to be 9.5% ($1,000,000 less the $50,000—i.e. $950,000—would grow to $1,040,000 at an annual rate of 9.5%). The portfolio's net performance would have to be approximately equal to the sum of withdrawals (5%) and inflationary increases desired (4%). This example represents quite an aggressive investment posture. But this is exactly what an investor should expect from a risk tolerance perspective: the higher the amount of withdrawals to be taken and for investment performance to keep up with inflation on those withdrawals, the greater the equity market exposure required.

Third, with regard to the relationship between income adequacy and asset allocation, the level of inflation-adjusted withdrawals desired from the portfolio is directly connected to the investor's tolerance for investment risk. If the investor desires a relatively low level of inflation-adjusted income from the portfolio (e.g., 2%-3%), the appropriate asset allocation would be more heavily weighted toward bonds. This allocation would also be less volatile so the income would be more stable (though not fixed at any particular dollar amount). An investor requiring a higher level of income would use an asset allocation more heavily weighted to equities (and would accept the higher volatility in exchange for the potentially higher returns/withdrawals).

Fourth, as it pertains to legacy, while a variable-dollar withdrawal program does not eliminate the inefficiencies associated with taking fixed-dollar withdrawals from a portfolio that is subject to volatility, it reduces the effect significantly. Where a traditional fixed-dollar withdrawal program will keep taking larger and larger withdrawals from the portfolio even if the portfolio declines in value, a variable-dollar program will reduce the amount of the withdrawal taken when the portfolio declines (because the withdrawals are a fixed percentage of the portfolio value). This automatically adjustable nature of the variable-dollar withdrawals to increase when the portfolio increases in value and to decrease when the portfolio declines in value reduces the drag against the portfolio in bear markets and thus leads to larger legacies than the traditional counterpart program. But the trade-off is that the withdrawal income is as volatile as the underlying portfolio.

The author of this paper suggests a withdrawal scale that is a variable percentage of the portfolio, starting at 3.5% of the portfolio at age 65, increasing linearly by 0.2% per year, and ending at 10.5% of the portfolio at age 100. However, under no circumstances would the investor withdraw more than he/she would have under a traditional fixed-dollar 4% SWP with inflationary increases. Thus, the investor takes a withdrawal that is the lesser of the scale described and the traditional SWP. This has the effect of preserving the portfolio in down markets, allowing it to recover in up markets. The trade-off is that there may be periods where income is reduced; however, the alternative is depletion.

Insured Withdrawals—Guaranteed Lifetime Withdrawal Benefit (GLWB) on Variable Annuities

According to LIMRA's 2nd quarter 2010 Variable Annuity Sales study,[8] withdrawal riders were elected 87% of the time a variable annuity was sold, if such riders were available as an option. The guaranteed lifetime withdrawal benefit rider promises to continue systematic withdrawals to the owner of a variable annuity if the withdrawals should deplete the underlying retirement portfolio.

The GLWB riders are a form of insurance for traditional systematic withdrawals. In exchange for an insurance fee, the insurance company guarantees to continue the withdrawal stream for as long as the investor (or the last survivor of an investor and spouse) lives. This seems to be a natural "fix" for the traditional SWP. And judging by the utilization rates, investors and advisors seem to agree. However there are several trade-offs involved with this alternative.[9]

Inflation

The initial withdrawal rate under this program is typically 5%. However, there is no automatic annual increase built into the guaranteed withdrawals. Thus, each withdrawal under the program is exactly the same as the prior withdrawal; therefore, the investor may lose significant purchasing power over time. Most riders have a "step-up" feature that would reset the withdrawals allowed under the program to a higher level if the underlying portfolio becomes higher than the starting value. However, in order for the portfolio to achieve higher values, the net performance of the portfolio would have to cover the withdrawals taken, plus desired inflationary adjustments. This might otherwise require a substantial allocation to equities, but since the withdrawals are fixed dollar and unrelated to the underlying portfolio, there is a substantial likelihood that the portfolio will not perform sufficiently to grow (see the section "Depletion and Legacy Shortfall by Equity Allocation"). The GLWB on a variable annuity is thus unlikely to keep income growing with inflation.

Depletion Risk on the Portfolio Is Not Addressed

While the GLWB insures the withdrawals, it does not insure the portfolio. In other words, the insurance company makes no promise to maintain the portfolio value at any particular level. And as we have seen in the analysis, there is a significant likelihood that the portfolio may be depleted. However, the absence of an automatic annual increase (inflation adjustment) on the withdrawals under the GLWB program helps to reduce depletion risk.

Higher Fees

The overall total fees in variable annuities that include a GLWB rider may range from 200 bps to over 300 bps. As shown in the earlier analysis, higher fees are associated with substantial risks of legacy shortfall. In addition, higher equity allocations do not provide incremental legacy rewards. Therefore, it would be a serious misperception to expect that a variable annuity with a GLWB rider is likely to leave a legacy that exceeds the premium(s) deposited into the contract. Many advisors suggest that since the GLWB provides a guarantee of income, the investor can thus afford to take higher equity exposure (up to the limit imposed by the insurer) in the hopes of achieving superior growth on the underlying portfolio. The analysis suggests the exact opposite is true once withdrawals under the GLWB have begun.

Simple "Two-Bucket" Annuitization and Growth Strategy

The objectives of generating income from a portfolio and simultaneously growing the portfolio can be thought of as competing objectives: the higher the income generated, the lower the likelihood of leaving any significant remaining asset over sufficiently long periods, and vice versa.

One way to hold each of these competing objectives away from one another is to wall them off into separate unrelated "compartments" where there can be no interference of one objective with the other and each mechanism can act on its own. One compartment of the portfolio would be dedicated to efficiently generating income, while the other compartment of the portfolio could be dedicated to efficiently generating investment returns.

In practice, this can be easily accomplished by splitting the portfolio into two portions or "buckets." Bucket 1 is "annuitized" (i.e. used to purchase an income annuity) without any concern for growth (since the growth objective is addressed by Bucket 2). Bucket 2 is used for pure accumulation of this portion of the portfolio without any concern for generating income (since the income objective is met by Bucket 1).

Bucket 1: A withdrawal strategy is not used here because, as demonstrated earlier, withdrawal programs can be an inefficient method for generating income, may require more assets to generate a given level of income, and come with a risk that withdrawals will not last for a sufficiently long time. Instead, an income annuity is used for two reasons:

(1) Automatically increasing income can be generated over the investor's lifetime regardless of how long or short that might be. Many advisors have a mistaken belief that income annuities cannot provide an inflationary increase when in fact this option has been commonly available for decades.

(2) An income annuity is highly efficient and can generate a given level of desired income using fewer assets than alternatives.[10] The additional effect of this efficiency in Bucket 1 is that more assets can be deployed in Bucket 2. For example, assume the investor is a 65-year-old male with $1,000,000 of assets. This investor could use the entire $1,000,000 of the retirement assets in a 4% SWP with a 3% annual increase. The starting income would be $40,000 in the first year, $41,200 in the 2nd year, and so on. Under the "two-bucket" strategy, he

could use $770,000 to purchase an immediate annuity that would generate exactly the same income as the SWP, but this income would be guaranteed to last as long as the investor lived regardless of how long that would be. (Quotes are based on income annuity prices available in the annuity market in September 2010. Income annuity prices vary with interest rates, and interest rates in September 2010 are among the historically low levels; thus, this example is presented at a time that would put income annuities at the greatest disadvantage. In addition, guarantees are subject to the claim paying ability of the issuing insurer.)

Bucket 2: The remaining $230,000 would be placed in Bucket 2 and invested according to the investor's risk tolerance. Assume that the investor selected a balanced asset allocation program for the assets in Bucket 2. Using a Monte Carlo analysis with identical assumptions for the SWPs (except the withdrawal rate is set to 0%, because no withdrawals are taken from Bucket 2) shows that there is a 23% chance that Bucket 2's initial $230,000 would generate a legacy of less than $1,000,000 over a 25-year period. Over a 35-year period, the shortfall risk is only 4%. This assumes a 50% equity allocation in Bucket 2.

Our earlier analysis of legacy shortfall risk showed that for a 4% SWP with a 3% annual increase, there was a substantial legacy shortfall risk of 17% over a 25-year period, and 25% over a 35-year period, using a 50% equity allocation.

The two-bucket strategy thus provides substantial advantages over an SWP given a sufficiently long horizon, the type of horizon that may be presented by realized longevity. The same income can be generated but with guaranteed income for life (no risk of running out of income, except for the exposure to the default risk of the issuing insurance company), plus there is a significantly higher chance of leaving a legacy for heirs the longer the investor lives. Contrast this with the traditional SWP where there is an increasing likelihood of depletion risk and an increasing likelihood of a legacy shortfall the longer the investor survives in retirement. In other words, the two-bucket strategy is more likely to grow a significant legacy while protecting the investor from longevity risk. In addition, the investor can potentially take more equity risk in Bucket 2 since the equity exposure of the overall portfolio is lowered by the fixed-income instrument in Bucket 1.

The advantages of this two-bucket strategy (annuitization and growth) can be realized even in an environment of historically low interest rates that would put the income annuity at its greatest possible pricing disadvantage. Furthermore, it suggests that the advice that investors are typically given to "wait for rates to rise" in order to get a possibly better income annuity price, or to purchase the income annuity in a series of smaller purchases (so-called "laddering"), may be harmful. The advice to ladder purchases of income annuities could be risky if the alternative is to rely on an SWP while delaying the purchase of the income annuity as there may be serious repercussions in such a delay. The portfolio could be partially depleted over a significant "delay period," leaving insufficient assets to purchase the income annuities needed in Bucket 1 or to grow the desired legacy in Bucket 2. The analysis strongly suggests that the better advice is to purchase the entire income annuity in Bucket 1 in a single lump sum at the time the two-bucket strategy is implemented, regardless of the interest rate environment. However, there are several trade-offs involved with the two-bucket alternative where the SWP is perceived to have an advantage.

Liquidity and Access to Assets

The income annuity used for Bucket 1 in this example is illiquid. Once purchased, the $770,000 cannot be accessed in a lump sum. However, there are several considerations. As long as the investor would not need access to more than the $230,000 in Bucket 2, the liquidity needs are provided for. Furthermore, accessing Bucket 2 has no impact on the income delivered by Bucket 1, whereas accessing any assets from the SWP beyond the regular withdrawal will increase the risk of depletion on the remaining assets in the SWP unless the withdrawals are proportionally adjusted downward. In addition, it is possible to purchase an income annuity that provides for access to underlying values via a commutation feature; however, this type of income annuity may have a higher cost.

Flexibility to Change Program Midstream

The SWP program can be disbanded or modified at any time. However, the purchase of the annuity is usually irrevocable. On the other hand, the fact that the investor cannot arbitrarily change or disband the income portion of the two-bucket program or spend down the assets allocated to Bucket 1 faster than planned is not necessarily a disadvantage. This may help protect investors from themselves and the behavioral risks involved (they cannot decide on a whim to go out and "buy the yacht" with the Bucket 1 assets). Lack of flexibility has a flipside—enforced discipline that protects the income stream from spurious financial decisions.

Fees

Although a fixed income annuity charges no explicit fees and the income quoted is exactly what would be guaranteed without further reduction for fees, the word "annuity" is usually associated with high fees. There is a perception therefore that the two-bucket strategy involves high fees. As indicated in the example above, there are no fees in Bucket 1. The fees in Bucket 2 are commensurate with whatever accumulation vehicle and advice structure is used in Bucket 2. Bucket 2 could be a low-fee mutual fund platform.

Longevity Insurance Hedge

One of the key elements driving depletion risk in the traditional SWP is the length of the retirement time horizon over which withdrawals are taken. For horizons of 15-20 years, depletion risk seems somewhat low. But as retirement horizons extend well beyond the 20-year mark into the 30-35 year range, the depletion risks appear to increase in a nonlinear fashion toward certainty. This is the essence of longevity risk. Since the investor's lifetime is indeterminate—the investor cannot predict the date of death with precision and there is a significant likelihood that the investor may live for an extended period in retirement—the SWP program is at the mercy of longevity risk.

One way to hedge away this longevity risk is to use "pure longevity insurance."[11] Under a longevity insurance policy, in exchange for the insurance premium, an insurance carrier bears the risk that the investor lives beyond a certain trigger age. The trigger age can be elected by the investor. If the investor outlives the trigger age, the insurance company guarantees (subject to its claims-paying ability) to pay the investor a predetermined amount of annual income (with or without an inflation adjustment) for the remainder of the investor's lifetime. The higher the trigger age, the lower the insurance premium. The higher the annual income benefit, the higher the insurance premium. Finally, if the income benefit has an inflation offset, the insurance premium will be higher than a benefit without an inflation offset.

A longevity insurance contract can be used to "peg" the time horizon over which the SWP must perform. It serves as a sort of "backstop" on the depletion risk. By pegging the retirement horizon of the SWP in the 15-20 year range, the depletion risks on the SWP can be held within tolerable levels while the insurance fills in any income payments beyond the backstop or trigger age.

Here is an example of how the longevity hedge program might work in conjunction with a traditional SWP. Assume the investor is a 65-year-old male with a retirement portfolio of $1,000,000. This investor could use the entire $1,000,000 of the retirement assets in a 4% SWP with a 3% annual increase. The starting income would be $40,000 in the first year, $41,200 in the 2nd year, and so on. The investor would be exposed to a risk of depletion exceeding 15% if the retirement horizon extended to 35 years.

Alternatively, the investor could hedge the income beyond age 85 (a 20-year backstop) using a longevity hedge. The income payments to be covered starting at age 85 are $72,244 increasing at 3% each year. The $72,244 income at age 85 is what the withdrawals would have been at that age if the longevity contract were not in place.

The cost of the longevity insurance contract in this example is $173,867. (Quote is based on insurance rates available in September 2010). The SWP program would then apply to the remaining $826,133 of retirement assets. Since the desired withdrawals start at $40,000, this represents a 4.85% initial withdrawal rate ($40,000 divided by $826,133) for the SWP. But the withdrawals are only needed for 20 years (ages 65 through 84). The risk of depletion of a 4.85% SWP with a 3% annual increase is slightly less than 6% (see results for 5% SWP, 20-year period in the section "Depletion and Legacy Shortfall by Length of Retirement Period and Withdrawal Rate").

The result of an appropriately structured longevity risk hedge for the traditional SWP is to reduce depletion risk while assuring the income stream continues for as long as the investor lives. There are other significant benefits as well. If the investor lives beyond the longevity insurance trigger age then he/she no longer needs to make withdrawals from the remaining portfolio (if it has not been depleted); therefore, any remaining portfolio at the trigger date can be structured for pure accumulation from that point forward without the drag of withdrawals, and thus can generate a meaningful legacy while the longevity insurance generates the required income.

For example, over the 20-year period, there is a 63% chance that the assets of $826,133 for the withdrawal program will be preserved by age 85 under a 4.85% withdrawal rate with a 3% annual increase. Should that be the case—that these assets are preserved—there is a 95% chance that the $826,133 at age 85 will grow to at least $1,000,000 in 10 years (that is, by age 95) without taking further withdrawals. Thus, the overall chance that at least the original $1,000,000 is available for legacy purposes over a 35-year time frame is 60% (63% multiplied by 95%). Or conversely, the likelihood of a legacy shortfall with the hedged program (i.e. leaving less than the original $1,000,000 asset) is 40% (1 minus 60%) over a 35-year horizon. Table 9 shows the comparison of depletion risk and shortfall risk for the unhedged traditional 4% SWP with a 3% annual increase versus the same program hedged with longevity insurance over a 35-year period. The reason that the shortfall risk is increased from 25% to 40% under the hedged program is that there is a cost for hedging longevity risk (the longevity insurance premium). The hedging strategy offers an alternative risk profile to the unhedged program—reduced depletion risk in exchange for moderate increases in the legacy shortfall risk over a 35-year horizon. However, there are also other trade-offs involved with the longevity insurance hedge.

TABLE 9

Withdrawal Program	Risk Measure	
	Depletion	Shortfall
Unhedged	15	25
Longevity hedge	6	40

The Pure Longevity Insurance Contract Provides No Death Benefit Prior to the Trigger Age

The premium spent for a pure longevity insurance contract provides no benefit if the investor should die prior to the trigger age. However, there are several considerations:

- All insurance contracts require the payment of an insurance premium, and if the risk being insured does not occur, the purchaser of an insurance contract does not typically expect the insurance premium to be returned.
- It is possible to purchase a longevity insurance contract with a death benefit that refunds the premium; however, this is considerably more expensive. In the example above, if a death benefit option were added to the longevity contract, the cost would increase from $173,867 to $278,383 (quotes based on insurance contracts available in September 2010), a 60% increase in the insurance premium. Furthermore, the higher insurance premium would leave fewer assets—$721,617 ($1,000,000 minus $278,383)—in the portfolio from which to draw the initial $40,000, resulting in a higher withdrawal rate of 5.55% ($40,000 divided by $721,617), which could result in an unacceptable increase in the potential risk of depletion over the 20-year period.

The Pure Longevity Insurance Contract Is Illiquid and Has No Cash Value

The premium spent on a longevity insurance contract is illiquid and cannot be accessed in a lump sum. However, it is possible to purchase a longevity contract that contains a "commutation" option. This option would provide access to some portion of the premium, but the option would come at the cost of a significant addition to the premium. The value of pure longevity insurance without additional options is that it is much less expensive and allows the investor to eliminate longevity risk while reducing depletion risk.[12]

Longevity Insurance May Be Perceived as Expensive

While it is clear that the cost of the longevity insurance contract demonstrated in the example above is a substantial lump sum, it represents in this example a one-time cost of about 17% of the retirement portfolio. This probably could not be characterized as inexpensive; however, several of the insurance companies who offer longevity insurance contracts allow for premiums to be paid over time rather than in a lump sum. When viewed in this context—spending about 20% of the portfolio over a 20-year period (or 1% of the portfolio per year for 20 years), the annual cost of the insurance (though higher than the lump sum cost) may seem much more in line with the type of annual portfolio fees investors might expect to pay for additional benefits or advice related to the portfolio. Thus, the choice is up to the investor as to whether to pay for the insurance in a single lump sum or in installments over time. In the example above, if the investor lives beyond the trigger-age of 85, the longevity premium of $173,867 would be "recovered" from the insurance income benefits paid by age 87.

Each of the four alternative strategies described above addresses critical shortcomings of the traditional SWP. It is tempting to think of each as the potential solution that could be used in all situations because of the compelling way in which each may solve the problem of converting retirement assets into income while improving upon the serious shortcomings of the traditional SWP. However, each has certain shortcomings that may compromise the retirement objectives of a particular investor in some situations.

Combination Approaches

Perhaps the question is not, "Which approach is best for the investor?" Instead, given the different degrees of benefits and trade-offs involved with each approach, perhaps the better question is, "What portion of the retirement portfolio should be allocated to each alternative strategy?"

This is called a "product allocation" approach. The investor could allocate portions of the retirement portfolio to different approaches based on the purpose and needs that that portion is geared to address. For example, portion A of the assets can be allocated to the two-bucket strategy in sufficient amount to generate income to meet basic retirement expenses that must be met under all circumstances. An example may be income to cover the basic expenses of food and shelter and to meet a specific minimal legacy. Portion B of the retirement assets could be placed in a variable annuity with a GLWB rider; this portion would not be relied on for any income but would provide protected growth by providing downside insurance against market declines. The insurance would be paid off as lifetime withdrawals should this allocation experience severe market declines. Portion C of the retirement portfolio could be placed into an SWP (with or without a longevity hedge) where withdrawals are used to meet discretionary expenses such as entertainment or travel—expenses that are not required to continue for life or may be dropped or reduced if circumstances warrant.

Conclusions

While much has been written in the financial media and in the research arena about SWPs and the underlying investment strategies that could be pursued to improve upon the so-called "safe withdrawal rates" that can be provided, very little, if any, rigorous analysis has been presented simultaneously along all of the dimensions involved in such programs and the implications for key retirement goals of maintaining sustainable income for life and leaving a meaningful legacy. In particular, there has been research demonstrating that when incorporated into a systematic withdrawal program, lifetime annuities can eliminate longevity risk for a portion of the investor's income goals.[13]

Some proposals have been offered that seek to incorporate "annuity-like" programs within the portfolio distribution phase;[14] however, such a construct could only be offered by a legally authorized insurance company under the state and federal laws in effect as of the date of this writing.

In addition, given that distribution from an asset portfolio is a relatively young science compared to the science of wealth accumulation, advisors would be well advised to become more adept regarding the dynamics involved in distribution strategies and how these fundamentally differ from the dynamics of pure accumulation strategies.

This paper has provided a unique, in-depth analysis of SWPs and demonstrated that they are unsafe at any practical speed. The SWP is essentially a highly inefficient approach to utilizing accumulated wealth to generate all of the income needed in retirement and meet other retirement objectives such as leaving a legacy. There is a trade-

[illegible]