Purpose-Driven Sustainable Withdrawal Rate

By Jim Otar, CFP®

Sustainable withdrawal rate (SWR) is the maximum amount of money that you can withdraw from a portfolio throughout retirement with an acceptable risk of depletion. It is usually expressed in terms of a percentage, such as the famous “4-percent rule.” This particular rule suggests that if you start withdrawing the dollar amount that is equal to 4 percent of your assets at the beginning of retirement and then index these withdrawals to the consumer price index (CPI) throughout retirement, you would have income for 30 years at an acceptable risk level.

Important factors that affect SWR calculations are: asset mix, equity index used, total return versus index return, using simulators versus aftercasting (defined below), portfolio costs, alpha and beta used.

In addition to these factors, this article addresses one other important factor: SWR is based on an acceptable risk, which raises the following question: “What is an acceptable risk level?”

Here is the simple answer: It all depends on what you need this money for. For that, we categorize each expense item in one of these three groups: essential, basic, and discretionary.

**Essential expenses**: These expenses are necessary for survival in a normal setting. Here, our risk criteria are, “The occasional loss of purchasing power must not be larger than 10 percent at any age.” This implies that the probability of portfolio depletion must be zero. We don’t want to plan for a client to go on a continuous dog-food diet, but we accept an occasional belt-tightening.

**Basic expenses**: These are expenses for items that are desirable but not critical for survival. For example, if a client loves going south each winter, when push comes to shove (financially), he can probably do without it. So, this is a nonessential expense, but it is not as nonessential as a discretionary expense. Here, our risk criteria is, “The probability of portfolio depletion should not exceed 10 percent at the age of death.”

**Discretionary expenses**: These expenses are flexible, exactly the opposite of essential expenses. For example, if we are talking about donation expenses, the client can accept a 50-percent probability of occurrence. If he does not have the money, he just won’t donate. This category of expenses affords a much larger SWR. Here, our risk criteria is, “The median outcome must last until death,” i.e., no more than 50-percent probability of portfolio depletion at the age of death.

**Retirement Expenses**

Add up the annual dollar amount of each expense item as essential, basic, or discretionary. Here, you need your client’s input as to how you categorize each expense item. What is essential for one client might be discretionary for another. For example, when we talk about child support expenses, if the child is disabled, then it likely would be essential; otherwise, it likely would be discretionary. Another example: Travel expenses might be essential for one client and discretionary for another. Discuss each expense item with the client to ensure it is entered in the correct group.

Generally, housing expenses, income taxes, and most living expenses are essential. You can expect that as the client gets older,
essential expenses increase and discretionary expenses decrease. In many cases, if the client owns a home, additional capital for higher future essential expenses can be raised by downsizing or selling the home at a later age.

Once we allocate each expense item to one of these three groups, then we have three piles of retirement expenses, each with its own specific level of acceptable risk. This risk level is lowest for essential expenses, a little higher for basic expenses, and a lot higher for discretionary expenses (see figure 1). This is the basis for the “purpose-driven sustainable withdrawal rate.”

As for the longevity risk, we want 90-percent certainty that the client expires before the portfolio. As a default, we use 95 as the age of death for male clients and 97 as the age for female clients or couples. However, in this article, we used 96 as the age of death for the sake of simplicity.

Methodology
In most retirement plans, forecasts are based on using average growth rates and inflation; i.e., they follow the law of averages. In contrast, we use Murphy’s Law to make sure that extreme events are covered. Murphy’s Law simply states, “Anything that can go wrong, will go wrong in the most damaging manner.”

Monte Carlo simulators have significant deficiencies in modeling market behavior. They use smoothened data, which suffer from “loss of memory” of correlations and black-swan events. Using actual historical data preserves the sequence of returns as well as all correlation data among stocks, bonds, interest, and inflation rates, resulting in a much more reliable SWR. We use actual market history, which we call “aftcasting.” We do not use Monte Carlo simulators.

Aftcasting displays the outcome of all historical asset values of all portfolios on the same chart, and it gives a bird’s-eye view of all outcomes for a given scenario. It provides the success and failure statistics with exact historical accuracy.

In this article, we use the following inputs:

**Equity benchmark and performance:** S&P 500, index only, between 1900 and 2013. For years before 1926, we use data from Shiller (1989), plus an average dividend yield of 2 percent, less average total costs (portfolio expenses, advisor fees, trading costs, etc.) of 1.5 percent.

**Fixed-income performance:** A conventional bond-ladder portfolio, held until maturity, no capital gains or losses, net yield after costs is the historical six-month certificate of deposit plus 1 percent.

**Asset mix:** Optimized to maximize the sustainable withdrawal rate for the entire retirement time horizon, rebalanced annually when the target mix deviates by more than 3 percent.

**Withdrawal amount:** Indexed to historical CPI rate for each year.

Keep in mind, any reference to a probability in this article is based on historical performance. Future black-swan events can be more extreme than they have been in the past. Therefore, it is important to review retirement plans periodically to include and adjust for future market events and also for changing client needs. Planning is an ongoing process.

Testing the 4-Percent Rule
Let’s see how the aftcast of the 4-percent rule holds up against our risk criteria.

Example: Bob, 65, has $500,000 in his portfolio with a 50/50 asset mix. Starting now, he needs $20,000 annually (4 percent of the initial portfolio asset value), indexed to CPI until age 96. Figure 2 depicts the asset chart. The green line represents the top decile, i.e., the lucky ones, and the red line represents the bottom decile, i.e., the unlucky ones, of all historical outcomes.

As interesting as this asset chart looks, our main focus is on lifelong income. For that, we observe the “income carpet” (figure 3). The horizontal scale shows starting years between 1900 and 2000. The vertical scale indicates the age of the client. Each pixel on the carpet shows the level of income received for that particular starting year and age, as a percentage of total real income required.

Each color indicates a different range of percentage. For example, green means that 100 percent of the required income was available. Yellow means that only 90–100 percent of the required income was available. Solid red means no income was available because the portfolio was depleted. In a nutshell, green is good, and any hue of red is bad.
Here are the statistics: Historically, in the worst case, the portfolio ran out of money at age 86. By age 96, the probability of depletion was 20 percent. Let’s see how this risk compares to our guidelines:

**Essential expenses:** The maximum allowable loss of purchasing power is 10 percent. That means we don’t mind seeing a few yellow pixels here and there on the income carpet, but no red (or reddish) pixels are allowed. Therefore, the 4-percent rule violates our test for “reasonable risk” for essential expenses.

**Basic expenses:** The maximum allowable probability of depletion is 10 percent by the age of death. Here, it is 20 percent. So, the 4-percent rule also violates our test for “reasonable risk” for basic expenses with this 50/50 asset mix.

**Discretionary expenses:** The maximum allowable probability of depletion is 50 percent. Therefore, the 4-percent rule can be comfortably used for discretionary expenses.

**Income from Other Sources**
You also need to make a list of all expected income from other sources. This list should include income from Social Security, company pensions, annuity income, rental income, business income, royalties, and so on. Do not include income from investments (open or tax-sheltered) because they are calculated separately.

Normally, income from other sources should pay essential expenses first. Retirement assets then pay any remaining shortfall of essential expenses, and only after that, basic and discretionary expenses. This allows a larger SWR from portfolio assets resulting in a better withdrawal efficiency (figure 4).

One key objective of a good plan should be to maximize income from other sources and to minimize withdrawals from retirement assets for essential expenses. Life annuities go a long way toward fulfilling this objective. They mitigate longevity risk and, because of the inherent age credit, the annuity payout rate is always higher than the sustainable withdrawal rate for essential expenses, regardless of the interest-rate environment.

**Purpose-Driven Sustainable Withdrawal Rates**
Tables 1, 2, and 3 summarize the sustainable withdrawal rates that we calculated for each expense category.

You might ask why optimum equity is highest for essential expenses, even though it is designed for the lowest risk among the three expense categories. The explanation lies in the definition of risk: For purpose-driven SWR, risk refers to loss of income, not to volatility of assets. For that reason, essential expenses have the lowest SWR; that means they have the longest portfolio life, and this longer time horizon means larger allocation to equities for the U.S. markets. (Note to Canadian readers: This cause-and-effect relationship does not hold true for the Canadian equities, which are more commodity-driven. There, a different inflation behavior produces a different effect.)

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**Figure 3: Bob’s Income Carpet**

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The optimum asset mix indicated in these tables should be used only as a guide. Your client's personal risk tolerance always supersedes the optimum. Make sure to respect that at all times. But keep in mind that deviating from the optimum reduces the SWR by as much as 0.4 percent for retirement ages 65 and younger, 0.2 percent for older retirees.

Worked Example

Bob (65) and Jane (65) retired recently. Their combined portfolios are worth $830,000. Their combined Social Security income is $32,000/year. They have no other income. They need a total of $70,000/year income. Of this amount, $40,000 is for essential, $22,000 is for basic expenses, and $8,000 is for discretionary expenses.

Step #1: Calculate income Bob and Jane need from their assets:

For essential expenses, they need to earn $8,000/year from assets, calculated as $40,000 (essential expenses required) less $32,000 (Social Security income). For basic expenses, they need to earn $22,000/year. For discretionary expenses, they need to earn $8,000/year.

Step #2: Calculate assets required to generate income for essential expenses:

The SWR on table 1 for age 65 is 3.21 percent. Bob and Jane need $249,221 in assets to pay for future essential expenses, calculated as $8,000 / 3.21 × 100%. The optimum asset mix is 45/55 for this portion of assets. They have $830,000; therefore they have abundant assets for essential expenses.

Step #3: Calculate assets required to generate income for basic expenses:

The SWR on table 2 for age 65 is 4.11 percent. Bob and Jane need $535,280 in assets to pay for future basic expenses, calculated as $22,000 / 4.11 × 100%. The optimum asset mix is 30/70 for this portion of assets. After setting aside $249,221 for assets to pay for essential expenses, they have $580,779 available, which is more than what they need to pay for future basic expenses.

Step #4: Calculate assets required to generate income for discretionary expenses:

The SWR on table 3 for age 65 is 4.80 percent. Bob and Jane need $166,667 in assets to pay for future discretionary expenses, calculated as $8,000 / 4.80 × 100%.

However, they have only $45,499 left in assets, calculated as $830,000 less $249,221 (essential expenses) less $535,280 (basic expenses), not enough to pay for future discretionary expenses.

In summary, Bob and Jane certainly have enough assets to meet all their essential and basic expenses. However, they have only $45,499 for their discretionary expenses, less than the required amount of $166,667. What can they do? Here are their options.

Considerations for the Shortfall of Discretionary Expenses:

Don't do anything, spend the money. They can spend $8,000/year on discretionary expenses. The money will likely last about six years. After that, no money is left for discretionary expenses. The time horizon is short, so this money should be placed in cash or near-cash assets.

Cut back their discretionary expenses. If they want to bring their risk down to 50-percent probability, then they need to...
Figure 5: Life Annuity Payout compared to SWR (payout rate as of October 2014)

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<thead>
<tr>
<th>Sustainable withdrawal rate</th>
<th>Acceptable risk</th>
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<tr>
<td>Payout from a CPI-indexed Life Annuity (10/2014)</td>
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<tr>
<td>Essential expenses</td>
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<td>Basic expenses</td>
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Buy a life annuity. The shortfall of essential expenses is $8,000. This is paid by the $249,221 portfolio. On the other hand, the cost of a life annuity (joint-and-survivor, fully indexed to CPI, 10-percent pay-cut upon first death, 10-year minimum guarantee period) to pay the same $8,000/year is about $227,000 (October 2014 rates). This is $22,221 less than the $249,221 that they need in the investment portfolio to provide the same essential income.

After buying this annuity, they have $67,720 available for discretionary expenses, calculated as $45,499 plus $22,221. Therefore, they can now have $3,250/year for discretionary expenses, calculated as $8,000 × $45,499 / $166,667. $8,000 × $45,499 / $166,667. This is 49 percent more than #2 ($2,184/year) and the longevity risk on essential expenses has been practically eliminated. The optimum asset mix is 30/70 for this portion of assets.

Figure 5 shows the payout from the life annuity compared to SWR from the portfolio.

A good retirement plan starts with a careful and comprehensive discovery process. Surely, it takes time to go over each expense item and categorize it as essential, basic, or discretionary, but it is worth the effort. The reliability and robustness of a plan with this degree of attention to detail can create a significant respect for your expertise among your clients.

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