Three Ways to Improve Safe Withdrawal Rates

By Geoff Considine, Ph.D.
June 1, 2010

Few problems facing financial planners have been as extensively studied as sustainable withdrawal rates (SWRs). Today, the conventional wisdom holds that a 4% SWR is reasonable, given a traditional 60/40 approach. But higher SWRs can be achieved in a number of ways, and the last chapter in the search for better deaccumulation planning is yet to be written.

Using Monte Carlo analysis, I recently examined three ways SWRs can be increased. I compared and quantified the benefits of increasing diversification beyond equities and bonds, increasing allocations to fixed income, and employing tactical asset allocation (TAA).

Let's look at how those three alternatives work:

Increase portfolio diversification beyond equities and bonds

Much that is written about SWRs focuses on a portfolio containing only stocks and bonds. Stocks are represented by an index, such as the S&P500, and bonds are represented by an aggregate bond index, such as the Lehman/Barclay AGG. Jonathan Guyton has demonstrated that a more diversified portfolio increases SWRs, and my work has led me to similar conclusions. In particular, commodities, real estate, utilities, and gold all have the potential to increase a portfolio's return relative to risk.

Increase fixed income allocations with TIPS or high-Beta equities

A related but less understood way to increase SWRs is to take a more radical approach to diversification. Robert Huebscher, the editor-in-chief of this publication, has proposed, for example, that a portfolio allocated between muni bonds and TIPS might be able to provide an SWR as high as the SWR from a traditional 60% stock / 40% bond portfolio. In my own work, I have explored the possibility of creating a portfolio that is overwhelmingly allocated to bonds (80%-90%), with the balance in very aggressive, high-Beta asset classes. This approach can also lead to higher SWRs while maintaining protection from a substantial melt-down in equities.

Integrate tactical asset allocation (TAA) into the portfolio plan

In simplest terms, tactical asset allocation exploits the fact that the price we pay for something matters. Michael Kitces, for example, has analyzed price-to-earnings ratios in the broader market as a way to determine SWRs more efficiently. He found that lowering the allocation to equities when price-to-earnings ratios are high (and vice versa) increased average SWR. There are other ways to integrate TAA into the SWR problem, too.

It's not just the SWR that matters, though…

An important theme that has emerged in recent years is that we must also consider the potential for a retirement-oriented portfolio to suffer massive losses when faced with a low-probability extreme event, such as we experienced in 2007-2008. The potential loss in such an event is only partly captured by the expected volatility of the portfolio, and it is only partly offset by the aggregate exposure of the portfolio to fixed income.

In times of great market stress, correlations among equity asset classes increase across the board, reducing the effectiveness of diversification in the short term. For investors drawing income from their portfolios, these short-term events can be very costly.

The projected volatility of a portfolio is an important consideration, regardless of its apparently sustainable SWR. A portfolio with a higher SWR may not be a good bet, especially if it means incurring higher expected volatility.

The baseline case

The standard "4% rule" suggests that an investor can plan to draw 4% of the value of their portfolio in the first year of retirement, and increase that amount to keep up with inflation each year. Someone who retires with a $1 million portfolio can, for example, plan to draw $40,000 in income during the first year of retirement. Both historical analysis and projections using Monte Carlo simulations suggest that this level of income draw is very safe, albeit surely not a guarantee.

The 4% rule typically assumes a portfolio that is 60%-70% equities and 30%-40% bonds. The relative safety of the portfolio is calculated as the probability that an investor will completely run out of money after a certain number of years – this is called the failure probability. For all of the examples presented in this article, we will target a plan that provides a projected 70% chance of being able to fund the income draws for 30 years (in other words, a 30% failure probability). Different assumptions about the acceptable failure rate will lead to different SWRs, but the relative impacts of the different strategies that we present here are consistent.

The decision to benchmark to a 70% probability of funding a 30-year retirement is arbitrary. Kitces, in his historical studies, looks for the largest draw that would have survived *every* 30-year period starting from 1871 to 1975. On this basis, Kitces comes out with a SWR for a 60% equity / 40% bond portfolio of 4.5% with zero probability of failure on the basis of rolling 30-year periods. As Kitces notes, however, the future is not necessarily like the past. In particular, there is every reason to believe that equity risk premium will be lower in the future than it was in the past century, which was characterized by America's global dominance. The baseline assumption that I use in my Monte Carlo simulations – that domestic stocks (the S&P500) will provide a real return of 5.3% – is consistent with a range of experts. Lower equity risk premia mean lower SWRs or higher failure rates.

When I run my Monte Carlo simulation (using the Quantext Portfolio Planner) based on data available through April 2010 with a portfolio that is 60% allocated to IVV (the iShares S&P500 ETF) and 40% allocated to IEF (iShares 7-10 Year Treasury ETF), I find that a 4.2% income draw results in a failure probability of 30% with a 30-year time horizon. QPP assumes a 3% inflation rate, consistent with the historical average over the past century and with many other studies of SWRs (including Kitces, for example). A portfolio that is 70% allocated to IVV and 30% allocated to IEF can provide a slightly higher 4.25% SWR with the same failure probability than its 60/40 counterpart. These results help to explain the origins of the so-called 4% rule.

For this analysis, the 60/40 portfolio is projected to have an average return of 6.6% with annual volatility (annualized standard deviation in return) of 9.1%. The 70/30 is projected to have an average return of 7% with annualized volatility of 10.6%. The baseline projection for the S&P500 is for a total return of 8.3% with annualized volatility of 15.1%.

Given the enormous market swings we've experienced in recent years, it's important to look at how the projected returns and volatilities have changed over time. The tables below show these statistics as of May 2010 and as of November 2007, when the S&P500 was near its peak.

Date	Expected Risk	Expected Return	SWR
December-07	8.4%	7.1%	4.6%
May-10	9.1%	6.6%	4.2%

Expected Risk, Return, and SWR for 60/40 Portfolio in Dec 2007 and May 2010

Date	Expected Risk	Expected Return	SWR
December-07	9.9%	7.4%	4.6%
May-10	10.6%	7.0%	4.3%

Expected Risk, Return, and SWR for 70/30 Portfolio in Dec 2007 and May 2010

The Monte Carlo projections are long-term expected values. The May 2010 simulations suggest slightly lower returns and slightly higher risk as compared to the results from before the market crash, as well as slightly lower SWRs. The changes in risk, return, and SWRs owe to increased correlation between equities and government bonds and to higher realized volatility over that time period. These results are generated from the perspective of strategic asset allocation, assuming annual rebalancing back to target weights. We will explore TAA in a later section.

Increasing portfolio diversification

Previous work, such as that of Jonathan Guyton cited above, has suggested that SWR can be increased by adding additional asset classes to increase the diversification benefits of the portfolio. To demonstrate the benefits of additional diversification, I designed a portfolio that kept the 40% allocation to bonds but diversified within that asset class and diversified the 60% previously allocated only to equities. This portfolio has a 30% failure rate over a 30-year retirement, equal to the projected failure rates used to determine SWRs for the previous cases.

Asset Class	Ticker	Percentage of Funds
Emerging Markets	EEM	10%
Utility Stocks	IDU	10%
Small Cap Value Stocks	IWN	20%
Commodities	DJP	10%
Gold	GLD	10%
High-Yield Bonds	COY	10%
Inflation-Protected Bonds	TIP	10%
Long-Term Government Bonds	TLT	20%

Diversified Portfolio

This portfolio yields considerably higher projected SWR’s than the generic 60/40 or 70/30 portfolios:

	Date	Expected Risk	Expected Return	SWR
Diversified	December-07	11.4%	10.6%	6.0%
	May-10	11.8%	8.9%	5.1%
60/40	Date	Expected Risk	Expected Return	SWR
	December-07	8.4%	7.1%	4.6%
	May-10	9.1%	6.6%	4.2%
70/30	Date	Expected Risk	Expected Return	SWR
	December-07	9.9%	7.4%	4.6%
	May-10	10.6%	7.0%	4.3%

Expected Risk, Return, and SWR for the Diversified Portfolio as of Dec 2007 and May 2010 vs. 60/40 and 70/30

The expected risk levels for the diversified portfolio are higher than for either the 60/40 or the 70/30, but the incremental return provided by increased diversification levels more than offsets the increased risk. The diversification benefits of including multiple new asset classes that have low correlations to one another are substantial. Small-cap value stocks have a very low correlation to gold, for example.

Similar to the baseline portfolios, the expected SWR is lower as of May 2010 than as of late 2007.

Higher fixed-income allocations

The idea that investors need substantial exposure to equities in order to have sufficient returns to provide for retirement income is common, and both Monte Carlo simulations and historical analysis support this conclusion. That said, there are two ways that we might achieve the necessary returns (with the same targeted failure rate) with higher allocations to fixed income. One way is to add substantial exposure to bonds with high expected returns, such as long-term Treasury bonds and high-yield corporate bonds, as shown below. The second way is to put the equity portion of the portfolio into high-risk asset classes, such as emerging markets, small-cap stocks, or precious metals. Both approaches are incorporated into the portfolio below:

Asset Class	Ticker	Percentage of Funds
Small Cap Value Stocks	IWN	10%
Gold	GLD	10%
High-Yield Corporate Bonds	COY	20%
Investment-Grade Corporate Bonds	LQD	20%
Inflation-Protected Bonds	TIP	10%
Intermediate-Term Government Bonds	IEF	10%
Long-Term Government Bonds	TLT	20%

Strategic High Fixed Income Portfolio

	Date	Expected Risk	Expected Return	SWR
High Fixed Income	December-07	6.8%	7.9%	5.1%
	May-10	8.7%	7.6%	4.7%
Diversified	Date	Expected Risk	Expected Return	SWR
	December-07	11.4%	10.6%	6.0%
	May-10	11.8%	8.9%	5.1%
60/40	Date	Expected Risk	Expected Return	SWR
	December-07	8.4%	7.1%	4.6%
	May-10	9.1%	6.6%	4.2%
70/30	Date	Expected Risk	Expected Return	SWR
	December-07	9.9%	7.4%	4.6%
	May-10	10.6%	7.0%	4.3%

Expected Risk, Return, and SWR for Strategic High FI Portfolio in Dec 2007 and May 2010

A purely backward-looking approach to asset allocation would of course favor higher fixed income exposure today, but our analysis using data available as of December 2007 also suggests that our 80% fixed-income portfolio is measurably superior to the generic 60/40 or 70/30 portfolios in terms of SWRs and also provides higher expected returns.

The combination of riskier bonds (corporate bonds and long-term government bonds) with a small allocation to high-Beta equities (i.e., small-cap value stocks) and an allocation to gold to offset the interest rate risk of the long-term bonds provides an intriguing alternative.

Tactical asset allocation

One of the standard approaches for determining SWRs is to calculate the failure rate of a given portfolio for each year in the available history. The overall failure probability is calculated by averaging across that history. This approach shows how a SWR fares in a range of market conditions.

Kitces takes a further step by aggregating historical periods as a function of price-to-earnings ratios for the S&P500. Unsurprisingly, an investor who retires when the P/E ratio of the market is low will be able to draw a higher income than one who retires when the P/E ratio of the market is high. Kitces uses Yale professor Robert Shiller's PE10 ratio, which normalizes earnings over the trailing 10-year period.

The idea that an investor's planned income draw could or should be a function of the P/E ratio represents an attempt to use tactical asset allocation to solve the SWR problem, which is typically approached purely from a strategic standpoint. Kitces suggests that SWRs can be safely increased further still if an investor increases his or her equity exposure when P/E ratios are low and decreases equity exposure when P/E ratios are high.

Today, PE10 is fairly high – high enough based on Kitces' analysis that we might want to reduce the expected SWR and/or reduce exposure to equities. Kitces uses portfolios with two asset classes: stocks (the S&P500) and bonds (an intermediate-term bond index). His analysis suggests that an investor with a 60/40 portfolio should plan on a 4.5% SWR, a bit higher than the 4.2% from my analysis for the 60/40 as of May 2010. If an investor is willing to market-time his or her equity allocations using P/E ratios, even one entering retirement in the current high-P/E environment, Kitces suggests that he or she might be able to draw as much as 4.9% in income.

So far, I have ignored shorter-term tactical considerations, but let's see how TAA might improve SWRs. To do so, I compared the trailing three-year returns of a portfolio to its expected return (the average annual return projected by the Monte Carlo simulations). A portfolio that has generated returns substantially above the expected return is likely to experience reversion-to-the-mean (RTM) and subsequently would be at risk of under-performance. Conversely, a portfolio that has been generating returns below expectations is likely to out-perform. This approach to TAA warned that equities were due to under-perform in late 2007 and that they were likely to recover in early 2009.

The various model portfolios discussed here can be examined from this tactical perspective both today and as of late 2007. We will then explore the potential ways to alter income planning on the basis of tactical considerations.

	Date	Expected Return	Trailing 3-Year Return	Tactical Assessment
High Fixed Income	December-07	7.9%	6.3%	Outperform
	May-10	7.6%	7.3%	Neutral
	Date	Expected Return	Trailing 3-Year Return	Tactical Assessment
Diversified	December-07	10.6%	10.8%	Neutral
	May-10	8.9%	4.3%	Outperform
	Date	Expected Return	Trailing 3-Year Return	Tactical Assessment
60/40	December-07	7.1%	7.8%	Underperform
	May-10	6.6%	0.4%	Outperform

Tactical Perspective

In late 2007, the 60/40 portfolio looked unattractive on the basis of our tactical measure because the expected return was below the trailing return – in other words, the S&P500 had out-performed and was due for a reversion to the mean. In December 2007, PE10 was a very high 25.7 and Kitces' assessment that equities were over-valued agreed with my tactical assessment.

Today, higher equity exposure looks quite good on a tactical basis. This statistically based tactical view is now at odds with Kitces' P/E ratio.

While the generic 60/40 looked poised to under-perform on the basis of our tactical criterion in late 2007, the diversified portfolio had expected and trailing returns sufficiently close to one another that the tactical outlook was neutral in late 2007, as in the table above. Today, the tactical outlook favors the diversified portfolio, as opposed to the neutral tactical view in late 2007.

In late 2007, our tactical measure suggested that the strategic high-fixed income portfolio was poised to out-perform. The subsequent market crash in the equities markets certainly favored portfolios with high allocations to fixed income. Today, however, the tactical outlook has shifted to neutral because bonds have out-performed in recent years relative to reasonable long-term expectations. There is meaningful risk of a reversion to the mean in many bond classes.

Kitces' strategy suggests that investors can actually draw more income today if they are retiring in a low-P/E environment. This has been true historically, but it would be hard to imagine an investor deciding that they could draw a higher fraction of their portfolio in spring of 2009, when P/E ratios were quite low, because the market was so volatile at the time. Certainly, P/E ratios favored higher returns, but it seems prudent to wait to see if you actually accumulate more wealth before spending it.

In contrast to Kitces' approach, it makes sense to select a portfolio allocation based on tactical considerations but to determine SWRs on the basis of strategic considerations. In late December of 2007, the high fixed income portfolio had higher expected return, lower expected volatility, and a higher projected SWR than the 60/40. Furthermore, tactical assessments projected the high fixed income portfolio to outperform, while they projected the 60/40 would under-perform. Today, both the 60/40 and the diversified portfolio are projected to out-perform on a tactical basis, but the diversified portfolio is projected to provide a substantially higher SWR (5.1% vs. 4.2% for the 60/40). Thus the diversified portfolio looks like the best bet of these alternatives.

Conclusions

The traditional approach to SWR planning ignores the three significant variations that we have discussed here: diversifying across broader asset classes, using a higher fixed-income allocation, and employing tactical asset allocation (TAA). The choice of SWR is not simply about how much risk an investor is willing to incur. Realistic SWRs depend on diversification levels, the specific types of equities and bonds included in a portfolio, and on whether a portfolio is likely to under-perform or outperform expectations in coming years. Many advisors would consider the second and third of these three ways to potentially increase SWRs controversial. The first is fairly well accepted, but even when it comes to diversification there is considerable room for debate.

I am sympathetic to Kitces' approach of determining asset allocation and SWR dynamically on the basis of P/E ratios. The relationship between the P/E ratio and the equity risk premium, however, is not sufficiently reliable going forward to bet one's retirement safety entirely on this factor. The consensus view, for example, is that equity risk premia will be lower going forward than they have been in the last 50-100 years, the period that Kitces studied. A lower equity risk premium may have a substantial impact on the future performance of Kitces' recommendations. The goal of my approach is to identify portfolios that provide favorable SWRs without consideration to tactical factors, but which are still well-positioned on a tactical basis.

Using a combined strategic and tactical approach, we can build portfolios that look good from a tactical basis and can provide for SWRs on the order of 5% per year. My results are based on a projected 70% chance of funding a 30-year retirement, and we have portfolios with projected annualized volatility of approximately 10%.

Substantial uncertainties permeate all of these estimates – we will all do well to remember that we have just gone through a [40-year period with negative equity risk premia](). These uncertainties mean that the concept of a 'safe' withdrawal rate is fluid. Even so, Monte Carlo simulations using forward-looking estimates suggest that we can increase income draws using the three approaches outlined here.

Geoff Considine is the author of a new book, ***Survival Guide for a Post-Pension World****, which explores SWRs in the context of strategic and tactical asset allocation (more information is available here).*

*Geoff's firm****, Quantext*** *is a strategic adviser to FOLIOfn,Inc. (www.foliofn.com), an innovative brokerage firm specializing in offering and trading portfolios for advisors and individual investors.*

www.advisorperspectives.com

For a free subscription to the Advisor Perspectives newsletter, visit:
http://www.advisorperspectives.com/subscribers/subscribe.php