How Much Can Clients Spend in Retirement?
A Test of the Two Most Prominent Approaches
By Wade Pfau
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In my last article, I described research-based innovations for variable withdrawal strategies from retirement portfolios. In this article, I put Jonathan Guyton’s decision rules and David Blanchett’s simplified withdrawal formula to the test. I simulate the income and remaining wealth generated with these two strategies using different underlying Monte Carlo assumptions. These results provide planners with a better understanding about the potential spending paths generated by these different approaches, and they also suggest where further improvements can be made with regard to designing variable retirement withdrawal strategies.

Brief overview of the spending strategies

My last article explained two of the key research-based variable retirement withdrawal frameworks: Jonathan Guyton’s and Dave Blanchett’s. Here’s a brief refresher.

Guyton’s decision rules have been popular with advisors for the past 10 years, providing a guide for increasing initial retirement spending on the condition that future spending may not always increase with inflation and may need to be cut when markets underperform. He proposed three decision rules:

- Withdrawal rule, which increases withdrawals for inflation if the portfolio experienced a positive total return in the previous year.
- Capital preservation rule, which reduces real spending by 10% if the year’s current withdrawal rate grows 20% above its initial level.
- Prosperity rule, which increases real spending by 10% if the current withdrawal rate fell by at least 20% below its initial level.

Though it will not be part of my simulations, he also included a portfolio management rule, which focuses on how the investment portfolio is drawn down and rebalanced between different assets.

The second framework I simulate has a long lineage culminating in Blanchett’s development of a simple formula to update sustainable withdrawal rates on a year-by-year basis, which he described in a September 2013 Journal of Financial Planning article. Whereas Guyton’s decision rules generally call for inflation-adjusted spending to continue unless certain conditions are met, Blanchett’s formula provides a new withdrawal rate to use with remaining financial assets for each year of retirement. This creates a more volatile spending path. Advisors input four variables to
determine an optimal withdrawal rate for each year of retirement: asset allocation, the remaining retirement time horizon, the targeted probability of success and an alpha term that reflects portfolio over- or underperformance relative to the built-in capital market expectations.

As this is a dynamic withdrawal model, Blanchett found that the optimal retirement horizon is the client’s median remaining life expectancy plus two years, and the optimal target probability of success is 80%. These parameters, when combined with the client’s asset allocation and capital-market expectations, provide a unique sustainable withdrawal rate for each year of retirement.

**Capital-market expectations**

To simulate spending and wealth with these withdrawal strategies, we must make a decision about capital-market expectations. This, in turn, suggests an appropriate initial withdrawal rate to begin retirement. In this regard, Blanchett’s system proves to be more flexible than Guyton’s. For illustration purposes, I will consider two sets of capital-market expectations.

Table 1 provides two sets of capital-market assumptions on which the simulations will be based (using a multivariate lognormal distribution).

The first set of expectations is based on Harold Evensky’s current inputs for MoneyGuidePro. These assumptions reflect lower stock and bond returns than implied by historical averages, which makes sense. Market conditions today suggest much less optimism about what may work for retirees. Interest rates are at historic lows and stock markets are overvalued based on metrics such as Shiller’s CAPE.

Nonetheless, many advisors are comfortable projecting forward the more optimistic historical experience of the U.S. For the second set of simulations, I used Ibbotson Associates' Stocks, Bonds, Bills, and Inflation (SBBI) data on total returns for U.S. financial markets since 1926. I used the S&P 500 index to represent the stock market and the intermediate-term U.S. government bond index to represent the bond market. In all cases, returns were calculated on an annual basis, withdrawals are taken at the beginning of each year and the portfolio was rebalanced annually to its target allocation.
Figure 1 illustrates the withdrawal rates produced by Blanchett’s rule using his optimal parameters for time horizon and probability of success, an assumed 60%/40% stock/bond allocation and capital-market expectations equal to both historical averages and the less optimistic assumptions developed by Harold Evensky for MoneyGuidePro. Relative to Blanchett’s baseline capital-market expectations, the alpha term for the historical averages is 1.2%, and the alpha term for the current market conditions is -1.1%.

The important aspect with Blanchett’s method is that we can find a precise initial withdrawal rate to use given our capital-market expectations. In this case, with the 60/40 allocation, the initial withdrawal rate for the couple at age 65 is 3.8% with current market conditions and 4.9% with historical averages. As the remaining time horizon shortens with age, we can observe the increase in sustainable withdrawal rates at subsequent ages.

As well, when transitioning from age 80 to 81, the remaining life expectancy drops below 13. This, in turn, reduces the time horizon input term below 15, which triggers the shift to the alternative formula that only includes remaining time horizon. Capital-market expectations do not matter beyond that age, which is why the withdrawal rates are the same for both sets of assumptions after age 81. These are the withdrawal rates used in the subsequent simulations.

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<th>Capital-market assumptions for real returns based on current market conditions</th>
<th>Arithmetic Means</th>
<th>Geometric Means</th>
<th>Standard Deviations</th>
<th>Correlation Coefficients</th>
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<td>4.2%</td>
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Meanwhile, Guyton’s analysis is implicitly based only on the historical averages available at the time of his research, with no direction about how an advisor should adjust initial withdrawal rates for different capital-market expectations. This forces users to make further assumptions about appropriate initial withdrawal rates. Based on historical averages, Guyton reported initial withdrawal rates for different time horizons (30 or 40 years), different asset allocations (ranging from 50% to 80% stocks), whether or not international assets are included in the asset-allocation mix, and different portfolio success rates (from 90% to 99%).

For instance, using U.S. assets with a 50/40/10 allocation to stocks/bonds/cash and a 40-year time horizon, Guyton recommended initial withdrawal rates ranging from 4.5% (with 99% confidence) to 5% (with 90% confidence). With a 65/25/10 asset allocation, the recommended initial withdrawal rates of between 5.2% (with 99% confidence) and 6% (with 90% confidence).

To the extent that these scenarios do not match what an advisor assumes, or what I am aiming to simulate, further judgment must be used to decide on an initial withdrawal rate. As one of the key aspects of Guyton’s decision rules is the idea that initial withdrawal rates can be higher than justified with constant inflation-adjusted spending, I assumed an initial withdrawal rate of 5.5% for both set of capital-market expectations.
This is an entirely subjective decision. When the initial withdrawal rate is higher, there will be a greater tendency for spending to trend downward over time.

Results based on less optimistic current conditions

As a first step in comparing these strategies, Figures 2 and 3 show a probability distribution for real withdrawal amounts and real remaining wealth, using Monte Carlo simulation and assumptions based on current-market conditions. For each distribution, the solid line is the median outcome, while the dashed lines show the 10th and 90th percentiles.

Using the Guyton decision rules and my assumption of a 5.5% initial withdrawal rate, at the median there is a strong downward tendency in spending by age. In the median outcome, spending has fallen by half after 25 years. Nonetheless, with the prosperity rule, we do see the possibility for spending to rise on an inflation-adjusted basis in the 90th percentile.

Meanwhile, the Blanchett spending rule uses a lower initial spending rate of 3.9%, and in the median outcome there is a tendency for spending to rise with age until the mid-80s. After that age, wealth reductions outpace the increasing withdrawal rate, causing median spending to fall. After about age 95, spending falls precipitously as rising withdrawal rates at these ages cause a rapid drawdown for any remaining wealth.
Comparing the two strategies, the Blanchett rule is more conservative initially, but it becomes more aggressive with spending between the ages of about 75 and 100. The feasible spending with the Blanchett rule is quite low at the highest ages. With the Guyton decision rules, spending drops gradually at a relatively slow pace. Perhaps the 5.5% initial rate is too high for these capital market expectations, but in my judgment the distribution of outcomes with the Guyton rule is the more attractive of the two options, suggesting that it may just be a matter of searching further for an appropriate initial withdrawal rate linked to the advisor’s capital-market expectations.

Although it is not ideal, a safe withdrawal rate strategy will have an upward-sloping spending path at the median of the distribution because its conservative nature leads to spending increases in all but worst-case scenarios.

To put the relationship between withdrawal rates and spending in a broader context, Figure 3 shows the distribution of remaining wealth for each strategy. With the Blanchett rule, wealth is preserved more consistently in the early part of retirement with lower withdrawal rates, but at the higher ages the Blanchett rule causes remaining wealth to drop precipitously. But living beyond age 100 is a low probability event, and clients will have different attitudes with regard to allowing their spending to drop should they live to these advanced ages.

![Figure 3: Distribution of Real Remaining Wealth. Median and 90% Confidence Interval](image-url)
Results based on historical averages

For comparison purposes, I also provide results using Monte Carlo simulations based on historical averages. The distributions of spending (Figure 4) and wealth (Figure 5) rise as compared to the more conservative assumptions. In particular, the median outcome with the Guyton rules suggests only a slight reduction in spending over time, such that 5.5% is an appropriate initial withdrawal rate for average outcomes. Nonetheless, there are still significant spending reductions at the lower percentiles as well as increases at higher percentiles. With the Blanchett rule, spending again starts at a lower level but rises substantially in subsequent years before the precipitous decline after age 95.

When looking at the distribution of remaining wealth in Figure 5, the median remaining wealth holds rather constant with the Guyton rule, while spending incurs a bit more of a pronounced decline. This suggests that not allowing an inflation adjustment for spending after years with negative portfolio returns may be too harsh, as it implies a permanent spending reduction that is harder to overcome through application of the prosperity rule.

Guyton has developed a solution to this problem with a modified version of his withdrawal rule that only freezes spending in cases when the current withdrawal rate is higher than the initial withdrawal rate. I have not simulated this modification.
Individual spending-path simulations

The previous figures, showing the distribution of outcomes, do not provide the full story about how client spending will adjust on a year-by-year basis. The median spending path and remaining wealth at each age is the median across all the simulations, not the adjustment to be expected in any one particular simulation. To explore the nature of potential spending adjustments, we must view outcomes for individual Monte Carlo simulations.

Let's consider several examples that illustrate how the Guyton and Blanchett rules perform under certain market scenarios. In Figures 6-9, based on individual Monte Carlo runs, I show the spending path using a traditional 5.5% constant inflation-adjusted spending amount in order to provide greater context for the differences created by variable strategies.

Figure 6 shows spending paths for a rather unfortunate run in which the constant inflation-adjusted spending strategy would have resulted in portfolio depletion by age 85. With rapidly diminishing wealth, the Guyton rules call for a real spending reduction in year 3. By the couple’s late 70s, spending stabilizes at about $3,000 per year in real terms, compared to the initial $5,500. With this spending reduction, the couple has maintained over half of the real value of their initial portfolio even at age 97.
Note the relative smoothness of the spending path with the Guyton rules compared to the more erratic path followed with the Blanchett rule. With the Blanchett rule, spending starts lower but gradually increases with the rising allowable withdrawal rate.

Both the Guyton and Blanchett rules help to preserve wealth longer. One may wonder, based on this figure, whether the Guyton rules called for too quick of a spending reduction for clients aiming to maximize their lifetime spending, since the Guyton rules do help to preserve more wealth than may be necessary for higher ages. Alternatively, preserving that wealth could be a good decision as it provides a buffer for dealing with potentially high long-term care and health expenses.
Figure 7 shows the potential for variable rules to help preserve wealth by incorporating small spending reductions. With the Guyton rule, spending starts to decrease slightly relative to constant inflation-adjusted spending after age 70, and this difference ultimately results in the Guyton rules preserving more than 75% of the initial wealth in inflation-adjusted terms at age 105.

One may wonder whether the Blanchett rule is initially too conservative, as clients may not wish to plan for spending to be much higher when they are in their 80s and 90s relative to the early part of their retirement.

Figure 8 provides another interesting example. Though market returns are not shown, what we can observe from the wealth path is that there was a significant market downturn in early retirement, followed by a strong subsequent market recovery. As such, constant inflation-adjusted
spending would have resulted in portfolio depletion by age 84, while the other two approaches allowed for spending reductions that left the portfolios in a much stronger position to benefit from the subsequent recovery and to provide greater sustainability for spending later in retirement.

For one final example, Figure 9 shows a rather positive market experience for the retired couple, with the variable approaches supporting greater spending than otherwise possible with constant inflation-adjusted spending. In these positive market environments, wealth continues growing when spending does not adjust upward, and the variable strategies allow for the clients to spend a greater percentage of their resources.
Improving variable withdrawal strategies

My purpose in this analysis was to determine the spending paths that would be generated by different variable withdrawal strategies. It becomes clear that there are advantages and disadvantages with each of these two approaches.

The Guyton decision rules offer more stable inflation-adjusted spending, which adjusts only when certain thresholds are met. Smoother spending will appeal to many clients.

As well, if the initial withdrawal rate is calibrated appropriately, the Guyton rules provide distributions with consistent upward, constant or downward trajectory for spending. Advisors can
work with clients to understand their preferences between spending more now, ensuring that enough will be available to spend later in the event of a long life and leaving a legacy.

I see two disadvantages for the Guyton rules. They are not designed to allow advisors to make their own capital-market expectations. It is unclear how the initial spending rate should be modified when advisors have a different outlook for capital markets than what existed historically. As well, the fact that the prosperity and capital preservation rules do not make any adjustments to allow higher withdrawal rates at more advanced ages can be a disadvantage for clients who have sufficient remaining wealth and could justifiably spend more. Guyton suggests eliminating the capital preservation rule once the retirement horizon is less than 15 years, but that does not seem to adequately address this issue.

The Blanchett rule has the advantages that withdrawal rates are dependent on remaining life span and that it provides an intuitive way for advisors to make adjustments if their capital-market expectations differ from baseline assumptions. Also, his publicly available spreadsheet is easy to understand and to use.

As for disadvantages, inflation-adjusted spending amounts will be different in every year of retirement as the withdrawal rate and the remaining wealth continuously adjust. This is an artifact of how Blanchett revisits the sustainable spending decision annually and his model does not place any importance on avoiding spending volatility, whereas Guyton seeks a smoother trajectory that stays connected to the initial withdrawal rate. Regarding this point, Blanchett told me in an interview, “I don’t expect a retiree to follow these rules for 30 years; rather the rules and approach represent a better approximation of what a retiree would do in retirement (i.e., not follow the same static approach for the entire period). The estimates simply tell someone what is reasonable, and then the retiree has to decide how much they are going to take from the portfolio. If I were going to implement an approach like this this for an individual client, I would almost certainly incorporate a moving-average approach to smooth out the cash flows.”

As well, while it is an attractive feature to have withdrawal rates respond to remaining life expectancies, I think more must be done with regard to calibrating this better. The results shown here suggest that the Blanchett rule is too conservative in early retirement and too aggressive at higher ages, leading to unattractive lifetime spending paths.

More research about variable withdrawal rates should look to build in a smoother spending path with changes only made when thresholds are crossed, and to more carefully calibrate the relationship between withdrawal rates and age.
The bottom line

Creating these simulations was a valuable learning experience. Earlier, I was biased against the Guyton decision rules, thinking that they were developed in an ad hoc fashion and were less “scientific” than the actuarial approach developed by Blanchett and others. This research overcame my bias and I now set the two approaches on a more equal footing. Though I’m not convinced that the specific parameters used in the Guyton decision rules are optimal (and it would be worthwhile to explain alternative versions of his rules), they can be used successfully in practice and serve as a good foundation for advisors to work with clients on the issue of how much to spend in retirement.

The Guyton rules may be more appropriate for clients who have a clear spending budget in mind, but who nonetheless have flexibility to reduce spending when necessary. The Blanchett rule is a good choice for clients who do not have a clear budget, are flexible with spending, whose spending may be irregular with occasional major purchases that call for a reset on subsequent sustainable spending, and who wish to know what is feasible at each point in time.

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