

Assumptions

1. Economic
 - a. Portfolio: it's assumed that you hold a 60/40 stock/bond portfolio. This allocation has a 5.08% expected return and 9.57% standard deviation.
 - b. Inflation is set at 2%
2. Demographic: you both live to age 95
3. Spending
 - a. During our first meeting, we concluded that your annual discretionary spending was \$72,500 plus an additional \$20,000 for travel and vacation. Discretionary spending keeps up with inflation for the first third of the plan, lags inflation by one percentage point for the middle third and keeps up with inflation again for the last third. This is keeping with [research on retiree spending](#). The vacation spending keeps up with inflation throughout.
 - b. You both incur Medicare, Medicare supplement, and prescription drug plan expenses of \$333 per person per month beginning in January. Premiums grow at twice the inflation rate.
 - c. You buy two cars every seven years with the first purchase in ten years. Each car cost \$17,000.
 - d. You make annual charitable contributions of \$4300 (same as last year). The present value of these payments over thirty years is \$65,000. In other words, that is the amount of your portfolio dedicated to charity.
4. Social Security
 - a. The baseline plan assumes that Sue claims when Bill turns 66 in December 2018. That month he claims a spousal benefit and switches to his own benefit at age 70.
5. Retirement savings
 - a. I reduced your non retirement account balance by the \$24,000 HELOC balance.
 - b. \$100,000 of your non-retirement funds are not accessible for spending by the software. In other words, when a scenario fails a market simulation, \$100,000 plus home equity is still remaining.

Scenarios

This analysis accompanies the "Scenarios" sheet on the last page. This summarizes the probability of scenario success as well as ending plan values of your financial assets which also includes the \$100,000 safety buffer. These values are shown in today's dollars (today's spending power). These probabilities were determined by running your plan through simulated stock and bond market conditions 1000 times with rates of return and the sequence of those returns varying for each run. A "run" is marked as a failure if your financial assets decline below \$100,000. The table shows ending plan values of your savings in today's buying power at the 50th and 10th percentile. The 10th percentile is the run in which 10% of the 1000 runs had lower ending plan values and 90% had higher.

Scenario 1 is what you plan to do. **Scenarios 2** and **3** can be thought of as a stress test. In these scenarios, both your discretionary and vacation spending are increased by 20% and 30%. It's possible

that a 130% spending level would have to be reduced at some point. Though, you'd still have the \$100,000 safety buffer and home equity available for a reverse mortgage.

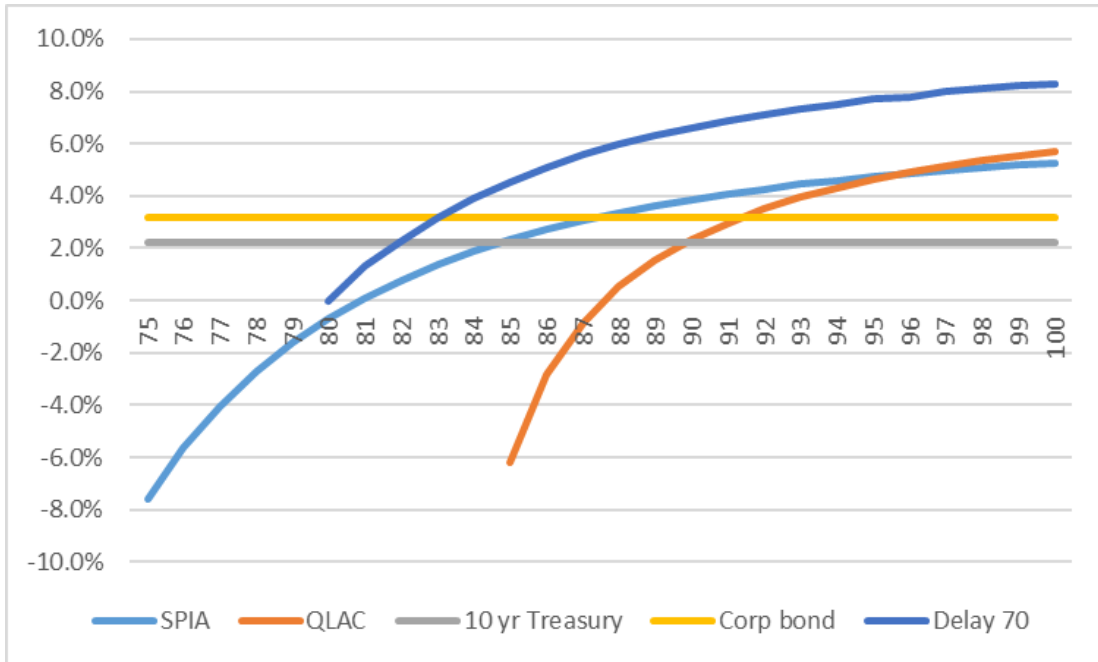
Scenario 4 shows the impact of you both delaying SS to age 70 vs the baseline claim described above. Note that both the deterministic and 50th percentile ending plan balance decline with the later claim. This is because the "investment" return from delaying SS vs. the baseline claim ages amounts to 4% by plan end. This is less than the portfolio expected return of 5.08%. An earlier claim allows more to stay in the portfolio growing at the expected rate. However, the actual investment growth rate experienced at the 10th percentile is less than 4% resulting in a larger ending plan balance for the delayed SS claim.

Scenario 5 investigates whether adding a single premium immediate annuity (SPIA) increases the strength of your plan. However, if you wanted more guaranteed income you would both first want to delay SS until age 70 which is how I set up this scenario. A later SS claim has an earlier breakeven rate and higher investment return than the SPIA. This is shown on the chart below. The curves represent the internal rate of return (IRR) for the delayed SS claim as well as the return provided by a \$200,000 deposit into a SPIA or \$125,000 into qualified longevity annuity contract (QLAC). A QLAC allows up to \$125,000 of an IRA account to avoid RMDs until age 85.

Concerning the delayed SS claim, the IRR is the rate of return that the foregone SS benefits, if claimed today, would have to be invested at to produce the increase in benefits that you'd receive by claiming at 70. Similarly, the SPIA and QLAC IRRs are the rates of returns that these deposits would have to earn to produce their income flows. At age 90 the SS IRR is 6.6% vs. 3.9% for the SPIA.¹ The QLAC is no more beneficial than the SPIA. I've added the current interest rates for the ten year treasury and Vanguard's Intermediate Corporate Bond fund for comparison. Note: the SS IRR is comparing a claim *today* vs. age 70. In scenario 4, I'm comparing the *baseline* SS claim to an age 70 claim.

As you can see on the scenario summary table (last pg) the addition of the SPIA reduces the ending portfolio value at the 50th percentile and slightly increases it at the 10th percentile. This is to be expected. The SPIA locks in a guaranteed but lower rate of return than would be expected at the 50th percentile (expected market returns). However, that low return is still better than market returns at the 10th percentile.

¹To test the SPIA, I reduced your taxable account balance by \$200,000 and added \$11,868 in annual annuity cash flow of which 77% is considered return of premium and is not taxable. In reality, you'd want the annuity in the IRA since the annuity "growth rate" is similar to that of a bond. However, within the software, I'm not able to account for the fact that the annuity payment counts as part of your RMD. This skews the results.



Scenario 6 shows that a more conservative 40/60 portfolio would provide a 12% greater ending plan value at the 10th percentile. However, you'd end with 23% less at the 50th percentile. This portfolio has a 4.5% expected return and 6.8% standard deviation.

SS strategies

Below are three claim strategies. The lifetime cumulative totals show real (without COLA) benefits discounted at 1% to take into account the time value of money. That is, \$1 in SS benefits paid in 20 years is worth \$0.82 = 1/(1.01²⁰) today. Financial theory holds that a cash flow should be discounted using the interest rate paid on a security of similar risk and return. In this case, the appropriate rate is that paid on 30 year TIPS. Bill claims a spousal benefit at age 66 in all of these strategies. Years to break even on the proposed claim is shown in the last column.

	Sue	Bill	Lifetime total	Years to BE on proposed
Proposed	Oct '17	70	\$1,585,000	
Sue claims when Bill turns 66	Dec '18	70	\$1,608,000	17
70	70	70	\$1,630,000	25

Analysis

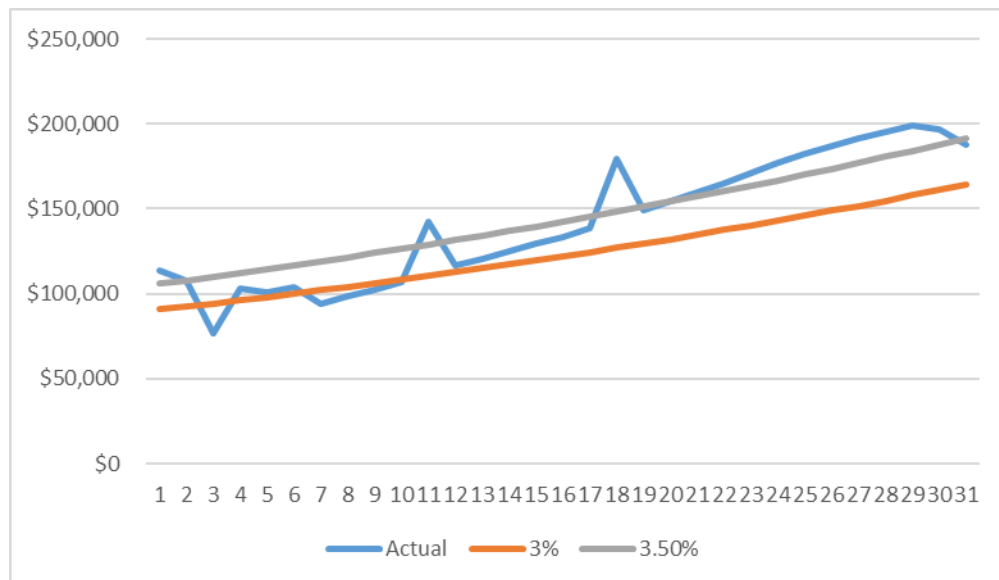
Whether a retirement plan is successful depends not only on market returns, but also the sequence in which those returns are realized. This is referred to as sequence risk and relates to the heightened vulnerability to investment declines early in the retirement plan. Both withdrawals for spending and poor returns can leave the portfolio at too low a level to recover when the good returns are realized.

Sequence risk never completely disappears. However, as the retirement progresses, it takes a progressively larger portfolio decline to have the same impact that a smaller decline would have earlier in the retirement period.²

Researchers have learned that an effective way to mitigate sequence risk is to keep withdrawal rates from the portfolio to a safe level. Historically, a 4.1% withdrawal rate would have protected a retiree during the worst thirty-year retirement period which began in 1966. (Specifically, they could have withdrawn 4.1% of their savings in the first retirement year; increasing each subsequent years withdrawal by the rate of inflation.) During that period, a 60/40 stock bond portfolio had an annualized real return (after inflation) of 0% for the first fifteen years. [Prominent researchers today are arguing that a 3% withdrawal rate will be necessary for thirty-year retirement periods beginning now.](#) The difference is attributed to low bond yields.

Below is a graph of your withdrawal rates under the baseline scenario. For comparison, I've added a 3% and 3.5% withdrawal rate. That is, 3% or 3.5% of your financial asset balance today. That withdrawal increases by the 2% inflation rate. This graph assumes that the portfolio is growing annually at the expected 5.08% rate. Note that you start off at or below the 3% line. In later years the graph gives the appearance that your spending is increasing above the 3% line. This is because taxes on RMDs are increasing due to the deterministic (5.08% annual) portfolio growth rate. Keep in mind that a 3% withdrawal rate should protect you under poor market conditions. In this graph, the returns are the ones that are expected; not poor. I added this graph to show you that planned withdrawals are at a safe level. (The spikes are car purchases).

Both SS and your pensions help to keep withdrawals low. In 2023, the first year that Bill receives 12 months of his own SS, pensions and SS cover 48% of your planned cash outflows including taxes.



² For more info, see [The Dynamic Implications of Sequence Risk on a Distribution Portfolio](#)

Scenario	Portfolio	SS claim date	Discretionary Spending	Vacation	Success	Deterministic	Real end value of savings	
							50 th percentile	10 th percentile
		Bill/Sue						
1	60/40	70/66	\$72,000	\$20,000	99%	\$2,978,530	\$3,043,217	\$1,107,105
2	60/40	70/66	120%	120%	92%	\$1,949,239	\$1,838,120	\$253,272
3	60/40	70/66	130%	130%	85%	\$1,731,962	\$1,631,572	\$148,680
4	60/40	70/70	\$72,000	\$20,000	99%	\$2,942,573	\$2,987,948	\$1,224,987
5	60/40 A	70/70	\$72,000	\$20,000	99%	\$2,899,129	\$2,811,132	\$1,245,067
6	40/60	70/66	\$72,000	\$20,000	99%	\$2,435,525	\$2,368,507	\$1,250,841

The baseline annual spending for discretionary spending and vacations is \$72,000 and \$20,000 respectively. Scenarios two and three test your plan at 120% and 130% of those amounts.

The baseline SS claim has Marcia claiming when Dan turns 66 and is able to file restricted application for spousal benefits.