

Jeff Speakes  
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In a prior [blog](#) I have discussed the components of building a sustainable financial plan. There were two key steps: first, take into account your “human capital” which is the present value of your estimated future income stream. Your total wealth is the sum of this human capital and your net financial capital (assets less liabilities, also known as “net worth”). Young people’s wealth is generally dominated by their human capital while for people near or in retirement, financial capital is the primary component of wealth. The second step of the sustainable financial plan is to make sure that you don’t allow your total wealth to dissipate over time. This means making additions to financial capital sufficient to offset the decrement in human capital as you age. To accomplish this, I proposed the Sustainable Spending Rule (SSR) where consumption spending is set at a fraction of total wealth, where the fraction of wealth is the expected after tax real rate of return on investment and total wealth includes both human capital and financial capital. I claimed that this spending rule is sustainable in the sense that the probability of outliving your assets is close to zero. In fact, if the actual return equals the expected return, then according to this rule, real wealth will not decline at all. This is because the investment return will exactly match the amount of consumption spending (for the geeks, Wealth at end of year equals Wealth at beginning plus investment return minus consumption, or  $W(t)=W(t-1)*(1+\delta)-C=W(t-1)*(1+\delta-\delta)=W(t-1)$  where  $W(t)$  is Wealth at time  $t$ ,  $C$  is consumption and  $\delta$  is the expected real after-tax rate of return).

However, we also want consumption to be smooth over time. If the actual investment return is volatile, then wealth will be volatile and so will consumption. To create a smoothed consumption path, we need to supplement the SSR with two modifications, the Retrenchment Rule and the Ratchet Rule.

The Retrenchment Rule was first proposed by economist Gordon Pye and was discussed in the blog referenced above. Suppose we denote wealth today as  $W(0)$  and over the next year we spend  $C(0)=\delta W(0)$ . If wealth next period ( $W(1)$ ) falls then consumption will fall as well, according to simple application of the SSR. This drop in consumption is what Pye calls “retrenchment.” The effect of his optimal retrenchment is to cushion this decline in consumption. After all, it is possible, even likely, that realized investment returns will be higher in some future periods, so the full decline in consumption spending as indicated by straightforward application of the SSR is not necessary. The version of the retrenchment rule that I propose is as follows: consumption in the subsequent year should be the minimum of consumption in the prior year and the amount of a fixed annuity calculated using current wealth and a conservative estimate of mortality (let’s say, age 110). In EXCEL this calculation is  $PMT(DR, 110-Age, Wealth*-1)$  where  $DR$  is the discount rate,  $Age$  is current age and  $Wealth$  is Wealth. In Pye’s “official” version, the discount rate is chosen to obtain the “optimal” amount of retrenchment. In my version, the discount rate is  $\delta$ , the expected real after-tax return. The effect of the retrenchment rule is to cushion consumption against unnecessary declines in the face of temporary drops in wealth.

This fixed annuity concept is essentially the same thing as “permanent income” which was famously introduced by economist Milton Friedman over fifty years ago. In his “Permanent Income Hypothesis”

(PIH), Friedman hypothesized that people spend a constant fraction of their permanent income. Of course, permanent income is not really permanent; it varies with changes in wages or investment returns. However, it is much more stable than observed income which includes random or “transitory” shocks. Friedman’s PIH is a theory of what people do; my SSR is a proposal for what people ought to do.

Conversely, suppose the actual investment return exceeds the expected return. This means wealth rises in the period and simple application of the SSR would call for increased consumption. But this may not be consistent with the goal of smoothed consumption. Surely, if wealth moves sharply higher we can afford to increase consumption, but we want to do so in a stable way (so as to make sure that the increase is sustainable). The method I propose for doing this is the Ratchet Rule. The Ratchet Rule is simply the SSR using a more conservative (lower) estimate of the expected return. I recommend using 1% for this calculation. You can certainly afford to spend 1% of your wealth each year. The 1% Ratchet Rule states that consumption during a period is the maximum of consumption last period or one percent of wealth.

Let’s suppose your estimate of real after-tax returns is 3%. This means that consumption in the year that you implement the SSR is three percent of current wealth. The 1% ratchet rule says that you will maintain this same level of spending until your wealth triples. You could consider variations of the ratchet rule using different minimum rates of return, but I think one percent is a great way to go.

## Application of the Rule

For capital market assumptions consider one risky asset (equities) with expected real after-tax return equal to 6% and annualized volatility 20% and one risk-free asset (for example, Treasury Inflation Indexed debt) with real after tax return equal to 0%.

Assuming an asset allocation of 50% to the risky asset and 50% to the risk free asset, the expected portfolio return is 3%. Using this “discount rate” we estimate total wealth for each household including the present value of future earnings and the present value of social security. Consumption for this first period (after implementation of the plan) is set at 3% of the current value of total wealth (call this “initial consumption”). Then, we consider shocks to actual investment return. If the return is lower than 3% we select next period consumption as the minimum of initial consumption and the fixed annuity  $PMT(3\%, 110-Age, Wealth*-1)$ . If the return is greater than 3%, we select next period consumption as the greater of initial consumption and  $.01*Wealth$ .

We can imagine conducting this exercise at the end of each calendar year to determine the subsequent year spending amount. I have conducted extensive simulations of this rule and find that it holds up well against major fluctuations in market returns.

To take one example, consider the median household, with head of household age 40, current income \$55,000 which is expected to increase in real terms by 50% over the next 20 years, and financial net

worth (including home equity but not human capital) of \$175,000. Assuming planned retirement at 65 and social security of \$21,000 per year in today's dollars, and using a 3% real discount rate, I calculate total wealth to be approximately \$1,600,000. Application of the SSR produces consumption spending of 3% of wealth or \$48,000 (and a personal savings rate of  $13\% = 1 - 48,000/55,000$ ). What is the risk of retrenchment? The Retrenchment Rule annuity (permanent income) is approximately \$55,000 so that if total wealth falls by more than 13% then consumption must be reduced. However, given that risky equities only comprise 5.5% of total wealth (financial capital is 11% ( $175,000/1,600,000$ ) of total wealth, and we have assumed a 50% allocation of financial capital to the risky asset), it is impossible for a market downturn to trigger retrenchment. Naturally, a retiree's wealth would be more dominated by financial capital, so a heavy allocation to equities would create some risk of retrenchment.

## Personal Savings Rate

In the example above, the personal savings rate under the SSR for the median household was 13%. What is the implication of the SSR for conventionally measured personal savings rates? This obviously varies widely depending on the extent of your financial capital and the probable future growth rate of wage or salary income. If you have significant assets or rapid expected income growth, then your SSR savings rate today could be very small, even negative. However, on average across all households, I estimate that application of the SSR would generate an average savings rate of about 20%, or roughly four or five times what we observe today.

The upside of this higher savings rate would be that the economic prospects for your children would be a lot better as the stock of capital would grow more rapidly. The "downside" is that you will in all likelihood be left with positive wealth in your declining years. This "excess" wealth represents consumption that you will have foregone. To many economists this is a bad thing. But another way of looking at it is that you will have significant protection against adverse outcomes, while promoting a social good (more capital).