Notes on Security Prices in a Market of Goals-Based Investors

Goals-based utility theory postulates that investors (of all types) interact with capital markets with specific objectives in mind (see Parker 2020). Investors seek to maximize the probability of achieving their objectives. These objectives vary, of course, but all goals carry three fundamentals: a funding requirement (W), a current wealth dedication (w), and a time horizon within which the goal must be achieved (t). The investor has some cumulative distribution function that defines the probability of success, so the utility function is defined as:

$$U = v(G)\phi(w, W, t).$$

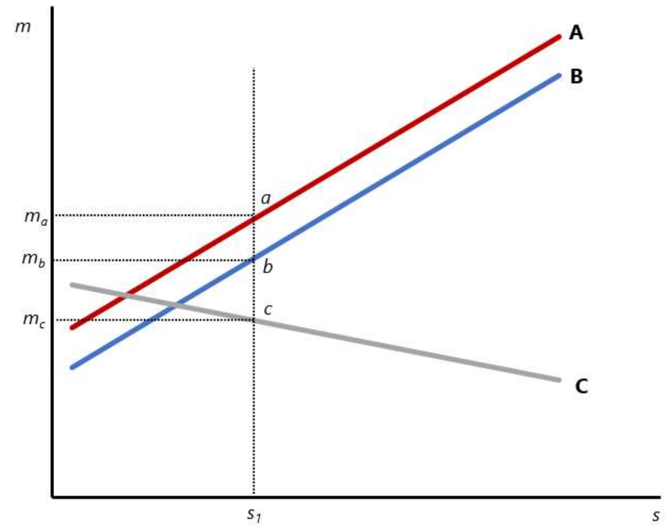
$v(G)$ is the value of the goal.

It is clear the investor maximizes utility by maximizing $\phi(\cdot)$. Or, alternatively, the investor can declare a minimum probability of goal achievement for the goal and determine what volatility and expected return is acceptable to her from capital markets. In that case, we can solve for the return of the risky asset that the investor requires for each level of volatility:

$$m \geq \left(\frac{W}{w}\right)^{\frac{1}{t}} - 1 + s\ln\left(\frac{1}{1-\phi} - 1\right)$$

In other words, an investor will enter capital markets attempting to get at least m, but willing to take more m if it is offered.

What becomes interesting is that each investor looks for a different return based on their specific variables. The figure at the top right plots the return sought from a risky security by hypothetical investors A, B, and C with expected volatility on the *x*-axis and expected return on the *y*-axis.



Note investor C is an oddity—traditional theories of utility would not expect C to exist because she will take less return as volatility increases. Goals-based investors, however, can be shown to be variance-seeking when the portfolio return is less than their required return. Such investors are not necessarily required for the model to work.

Suppose all investors believe the risky security will have a standard deviation of s_1. Investor A will enter that market attempting to get a return of at least m_a, B will attempt to get at least m_b, and C will attempt to get at least m_c. For the sake of illustration, let us take a simple version of price such that Price = $1/m$. Because C is willing to pay the highest price (up to $1/m_c$), investors A and B will sell their risky asset to C until C's liquidity for it is exhausted. They are willing to sell the security because at price $1/m_c$ the expected return is not high enough to justify the volatility, and they could take the cash and redeploy it into a different security market. However, when the price moves down to $1/m_b$, Investor A will sell to B until B's liquidity (or A's inventory) is exhausted. Investor A will buy if or when the price moves to $1/m_a$.

Note the difference, also, between Investor A and Investor B. Investor B has more money dedicated to her goal today than Investor B, but otherwise they are the same. This one change (added liquidity) yields an investor who will pay a higher price for the exact same security!

Of course, each security market is saturated with investors of all kinds (lines like A, B, and C are everywhere), and each investor's line shifts in response to all variables, so this is all just a cartoon model of the idea. Even so, it demonstrates a fractal structure of the marketplace as proposed by Peters (1994). It further demonstrates that prices are not just a function of the security's fundamentals (i.e. m and s), but also of the goal requirements of investors *and the liquidity they have dedicated to it relative to other investors*. In this way, a risky security can be "overpriced" from a fundamentals sense, while not from a liquidity sense because the liquidity of an investor with different acceptable returns can dominate market pricing.