Session 8

Behavioural Finance

Assume Barberis, Huang, and Santos economy where investor receives utility from consumption as well as recent financial gain or loss. Use these parameters:

$$\delta = 0.99, \quad \gamma = 1, \quad \lambda = 2$$

Consumption growth has lognormal distribution:

$$\ln\tilde{g} = 0.02 + 0.02\tilde{\epsilon}$$

where ϵ is standard normal random variable. Simulate probability distribution for consumption growth with (at least) 10^4 random draws from standard normal distribution.

With these parameters, risk-free rate is around 3% per year:

$$R_f = \frac{e^{0.0198}}{0.99} = 1.0303$$

Define x as one plus dividend yield for market portfolio:

$$x = 1 + \frac{P}{D}\frac{D}{P} = 1 + \frac{D}{P}$$

and define error term:

$$e(x) = 0.99 b_0 E\left[v(x\tilde{g})\right] + 0.99x - 1$$

where utility from recent financial gain or loss is given by:

$$v(R) = R - 1.0303 \quad \text{for} \quad R \geq 1.0303$$
$$v(R) = 2(R - 1.0303) \quad \text{for} \quad R < 1.0303$$

Solve for e(x) = 0 to find equilibrium value of x, using bisection search:

1. Set x_- = 1 and x_+ = 1.1, and use simulated distribution of consumption growth to confirm that $e(x_-) < 0$ and $e(x_+) > 0 \Rightarrow$ solution must lie between x_- and x_+
2. Set $x_0 = 0.5*(x_- + x_+)$ and use simulated distribution of consumption growth to calculate $e(x_0)$
3. If $|e(x_0)| < 10^{-5}$, then you have converged to solution
4. Otherwise if $e(x_0) < 0$, then solution lies between x_0 and $x_+ \Rightarrow$ repeat from step 2 with $x_- = x_0$
5. Otherwise if $e(x_0) > 0$, then solution lies between x_- and $x_0 \Rightarrow$ repeat from step 2 with $x_+ = x_0$

Repeat for b_0 in range from 0 to 10, in increments of 0.1 (or less).

- Calculate price-dividend ratio for market portfolio:
$$\frac{P}{D} = \frac{1}{x - 1}$$
Plot price-dividend ratio (on vertical axis) vs b_0.

- Calculate expected market return:
$$E\left(\tilde{R}_m\right) = E\left(x\tilde{g}\right) = xe^{0.0202}$$
Plot **equity premium** (on vertical axis) vs b_0.

- Briefly explain main characteristics of v(·) (which is utility function to measure utility from recent financial gain or loss), as well as economic significance of b_0 and λ.

Please submit all relevant results (including graphs and discussion of economic significance) as an Adobe PDF file to Homework 6 before end of Sunday, 5 Nov 2023.

50 % 1 of 2 topics complete

Wikipedia: Prospect Theory

Link

Lecture Notes: Behavioural Finance

PDF document