Problem Set 3

Macroeconomics B, Spring 2024

Exercise 1

Consider the model of default with uncertainty studied in class. Assume $r = 0.02$, $Y_2^H = 100$, $\rho = 0.05$, and $\phi = 0.5$.

(a) The optimal level of borrowing D_2 and the equilibrium interest rate r^s are determined by the supply of funds from international capital markets and the demand for funds by domestic residents. Derive the supply and demand functions $r^s(D_2)$.

(b) Represent these two curves graphically and determine how they are affected by a reduction in ϕ.

(c) The results were derived under the assumption of a full haircut in case of default. How do the results change if the haircut is only 50%?

(d) The results were derived assuming $Y_2 \in \left[Y_2^L, Y_2^H\right]$ and $Y_2^L = 0$. How do the results change if $Y_2^L = 20$? (with full haircut)

Exercise 2

Consider the Gamma equation studied in class:

$$\Gamma B_{t+1}^{H*} = E_t \left[M_{t+1}^* X S_{t+1}^*\right]$$

a) What does it imply for the expected excess return $E_t X S_{t+1}^*$?

b) What happens to $E_t X S_{t+1}^*$ when Γ increases? What is the intuition?

c) Assume that M_{t+1}^* is the marginal rate of substitution and $X S_{t+1}^*$ typically increases when "bad times" are expected. How does this affect $E_t X S_{t+1}^*$?

Exercise 3

Consider the expected real interest rate differential between German and Swiss one-year government bonds, $r_t^{*e} - r_t^e$. In the period 1999 to 2009 its estimated average was 0.79 (percentage points). It declined to -1.08 during the 2010-2020 period. At the same time, the expected excess return on German bonds, xs_{t+1}^e, increased from 1.34 to 2.49 between these two subperiods. How can you reconcile these facts?

Exercise 4

Consider the simple model of arbitrage with nominal bonds studied in class. Assume that the utility function is:

$$U(C_t) + V(B^F_{t+1}) + \beta E_t \{U(C_{t+1})\}$$

where $V(B^F_{t+1})$ represents the additional convenience of holding foreign bonds (e.g., for liquidity reasons). Assume that $V(B^F_{t+1}) = \chi B^F_{t+1}$.

a) Derive the expected excess return XS^e_{t+1} in this case.

b) Assume that the convenience yield on foreign bonds increases (χ increases). What is the impact on S_t and on XS^e_{t+1}? Give the intuition.