An example

The consumer

$$\max_{C_1, C_2, X} \log(C_1) + \beta \log(C_2)$$

under the intertemporal budget constraint. First, substitute the constraint

$$C_2 = \frac{P_1}{P_2}\bar{Y} - \left(\frac{P_1}{P_2} - \frac{Q}{P_2}\right) X + \frac{\Pi}{P_2} - \frac{P_1}{P_2} C_1$$

FOCs

With respect to C_1

$$\frac{1}{C_1} - \beta \frac{P_1}{P_2} \frac{1}{C_2} = 0 \Leftrightarrow \frac{1}{C_1} = \beta \frac{P_1}{P_2} \frac{1}{C_2} \quad \text{(Euler equation)}$$

With respect to X

$$-\beta \frac{1}{C_2} \frac{P_1}{P_2} + \beta \frac{1}{C_2} \frac{Q}{P_2} = 0 \Leftrightarrow P_1 = Q \ \underline{\text{in equilibrium}}$$