

**Econ 8108, Macroeconomic Theory**  
**Prof. José-Víctor Ríos-Rull**  
**Problem Set 3**

**Problem 1**

Formulate the sequence problem of SME in section 3 of the notes so that Arrow securities are paid in the beginning of period. and show that it is equivalent to the one defined in the notes.

**Problem 2**

Prove theorem 1 on page 11 of notes.

**Problem 3**

Show that (P1) and (P2) in section 3 of the notes are equivalent if we impose equilibrium conditions.

**Problem 4**

Write down the international firm's problem in the economy of section 3.1 using the model developed in section 3.2. Also define an equilibrium for this economy.

**Problem 5**

Show that when  $\mathcal{B}$  contains all the singleton subsets of  $Z$ , equilibrium is Pareto Optimal.

**Problem 6**

Construct an example where  $|\mathcal{B}| < |Z|$  and equilibrium is not Pareto Optimal.

**Problem 7**

Write an equilibrium formulation for the economy in section 3.3 where the only securities available are a risk free bond and stock of the single firm in the economy.

**Problem 8**

Show that for the economy in section 2.4, there exists a function  $\tau(\cdot, \cdot)$  such that  $H(K, B) = 0, (K, B) \in [0, \bar{K}] \times [-\bar{B}, \bar{B}]$  can be sustained as an equilibrium.