

# ECON4330

Exam questions

Spring 2023

## 1 Export Boom [45 Points]

Consider an economy (think of Norway) with a current account surplus. Now assume that the price of the exported good increases. The price of the imported good is unaffected. What happens to the NFA, the current account and consumption in this economy?

Explain your results. Keep your answer concise. There is no benefit from long but imprecise answers.

## 2 International Finance [15 Points]

For this part, please write short and precise answers. Introducing key equations can be helpful but the answers should primarily be described in words.

- Explain what a *forward contract* is (in the context of currency markets).
- Explain the two concepts *covered interest rate parity* and *uncovered interest rate parity*. Which (or both) of the two are implied by *no arbitrage*?
- Explain what is meant by the empirical regularity known as the *forward premium puzzle*.

## 3 International Risk Sharing [40 Points]

Consider an endowment economy with two periods, two countries, uncertainty, and complete markets. The output of Home is  $Y_1$  in period 1 and  $Y_2(s)$  in period 2 when the period-2 state is  $s \in \{1, \dots, S\}$ . The output of Foreign is  $Y_1^*$  in period 1 and  $Y_2^*(s)$  in period 2. Let  $p(s)/(1+r)$  denote the price of an Arrow-Debreu security  $B_2(s)$  paying out 1 unit in period 2 if the period-2 state is  $s$ . Let  $C_1$  denote consumption of Home in period 1 and let  $C_2(s)$  denote consumption of Home in period 2 if the period-2 state is  $s$  (correspondingly, let  $C_1^*$  and  $C_2^*(s)$  denote the consumption of Foreign).

- Write down the first-period and second-period budget constraints for Home, and then derive the consolidated budget constraint for Home. Assume that neither Home nor Foreign have any outstanding assets/debt. (The budget constraint for Foreign is symmetrical)

Let the preferences for Home be given by  $\log C_1 + \beta \sum_{s=1}^S \pi(s) \log C_2(s)$  (where  $\pi(s)$  is the probability that the period-2 state is  $s$ ).

- State Home's maximization problem given preferences and the budget constraint.
- Compute Home's first-order conditions. Home's first-order conditions, together with Home's budget constraint, should constitute a system of  $s + 2$  in  $s + 2$  unknowns (with the Lagrange multiplier) or  $s + 1$  equations in  $s + 1$  unknowns (if you eliminated the Lagrange multiplier).

Assume that Foreign have identical preferences to Home (and that, thus, the corresponding first-order conditions and budget constraint characterize the solution to Foreign's problem). In equilibrium, we have the aggregate resource constraints  $C_1 + C_1^* = Y_1 + Y_1^*$  and  $C_2(s) + C_2^*(s) = Y_2(s) + Y_2^*(s)$ .

- Summarize equilibrium by writing down the first-order conditions and consolidated budget constraints for Home and Foreign, as well as the aggregate resource constraints. Count the number of equations and unknowns (and recall that, by Walras's law, one of the resource constraints is redundant).
- Show that, in equilibrium, Home consumption is proportional to world output. That is, show that  $C_1 = \gamma(Y_1 + Y_1^*)$  and  $C_2(s) = \gamma(Y_2 + Y_2^*)$  for some constant  $\gamma$ . Hint: this can be shown by "guess and verify" by the following steps:
  - Guess that  $C_1 = \gamma(Y_1 + Y_1^*)$  and  $C_2(s) = \gamma(Y_2 + Y_2^*)$ . Solve for  $C_2^*$  and  $C_2^*(s)$  using the resource constraint.
  - Plug the guess into the first-order conditions for Home and solve for Arrow-Debreu prices  $p(s)/(1+r)$ .
  - Check that those prices also satisfy Foreign's first-order conditions.
  - Plug the prices and the consumption guess into Home's budget constraint and solve for  $\gamma$ .
  - (By Walras's law, it is not necessary to check that Foreign's budget constraint also is satisfied.)
  - Conclude that we have found prices  $p(s)/(1+r)$  and consumption  $(C_1, C_2(s), C_1^*, \text{ and } C_2^*(s))$  consistent with both Home's and Foreign's consumption problems and with the resource constraints. We have thus found an equilibrium of the model.