EC201 Macroeconomics 2, Term 1 2025
University of Warwick
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Support and Feedback Class 2 (week 4)
Current Account Sustainability and Determination

Pre-Class Review Questions Solutions

A. Pre-class Review Questions These review questions are designed to help you reflect on the lecture material and check your understanding. You must complete them before the support and feedback class. At the start of the class, you will need to show your answers to your tutor, who will record both your attendance and preparation. If you have any doubts about the questions, you can ask your tutor at the beginning of the session. Please note that review questions will not be discussed in detail during the class; however, brief answers will be posted on Moodle before the test and exam.

1. **Sustainability:** Indicate whether the following statements are true, false, or uncertain and explain why.

   (a) An economy that starts with a positive net international investment position will run a trade balance deficit at some point.

   (b) The fact that over the past quarter century the United States has run larger and larger current account deficits is proof that American house- hold savings have been shrinking.

2. **CA and TB Determination:** Consider a two-period small open endowment economy populated by a large number of households with preferences described by the lifetime utility function:
$$U(C_1, C_2) = C_1^{\frac{1}{10}} C_2^{\frac{1}{11}}$$
   where C_1 and C_2 denote, respectively, consumption in periods 1 and 2. Suppose that households receive exogenous endowments of goods given by $Q_1 = Q_2 = 10$ in periods 1 and 2, respectively. Every household enters period 1 with some debt, denoted B_0^*, inherited from the past. Let B_0^* be equal to -5. The interest rate on these liabilities, denoted r_0, is 20 percent. Finally, suppose that the country enjoys free capital mobility and that the world interest rate on assets held between periods 1 and 2, denoted r^*, is 10 percent.

   (a) Compute the equilibrium levels of consumption, the trade balance, and the current account in periods 1 and 2.

   (b) Assume now that the endowment in period 2 is expected to increase from 10 to 15. Calculate the effect of this anticipated output increase on consumption, the trade balance, and the current account in both periods. Compare your answer to that you gave for item (a) and provide intuition.

   (c) Finally, suppose now that foreign lenders decide to forgive all of the countryÕs initial external debt. How does this decision affect the country's levels of consumption, trade balance, and current account in periods 1 and 2. (For this question, assume

that $Q_1 = Q_2 = 10$.) Compare your answer to the one you gave for item (a) and explain.

Solutions:

1. (a) The statement is true. Repeated use of the law of motion of foreign assets in the absence of valuation changes, i.e. equation

$$B_t^* = (1+r) B_{t-1}^* + TB_t,$$

gives us condition

$$B_0^* = \frac{B_T^*}{(1+r)^T} - \frac{TB_1}{(1+r)} - \frac{TB_2}{(1+r)^2} - \cdots - \frac{TB_T}{(1+r)^T}.$$

In order for the rest of the world not to perpetually roll over its debt to our economy, it must be the case that

$$\lim_{T\to\infty} \frac{B_T^*}{(1+r)^T} \leq 0.$$

In order for our economy not to run Ponzi schemes either, it must also be the case that

$$\lim_{T\to\infty} \frac{B_T^*}{(1+r)^T} \geq 0.$$

Therefore, the net international investment position must be zero in the limit (so-called transversality condition) and we are left with the net present value of future trade balances:

$$B_0^* = -\frac{TB_1}{(1+r)} - \frac{TB_2}{(1+r)^2} - \cdots$$

Since the initial NIIP of our economy is positive, its trade balance will have to be in deficit at some point in the future.

(b) The statement is false: in and of themselves, growing CA deficits are not a proof of a decline in household saving. All they show is a widening gap between national savings and investment. We can understand this if we look at the current account from the following angle:

$$\begin{aligned}
CA_t &= rB_{t-1}^* + TB_t \\
&= rB_{t-1}^* + Q_t - C_t - G_t - I_t \\
&= Y_t^* - C_t - G_t - I_t \\
&= S_t - I_t,
\end{aligned}$$

where the first equality is only valid in the absence of international employee compensation and unilateral transfers, the second line uses the trade balance identity $TB_t = Q_t - C_t - G_t - I_t$, the third line uses the definition of national income $Y_t^* = rB_{t-1}^* + Q_t$ and the last line uses that of national savings $S_t = Y_t^* - C_t - G_t$. Whether rising CA deficits are due to falling private or public saving (or even rising investment) remains to be seen.

2. (a) We are told that $Q_1 = Q_2 = 10$, $B_0^* = -5$, $r_0 = 0.20$ and $r_1 = r^* = 0.10$ because of free capital mobility. With the given utility function, the marginal utilities of consumption in period 1 and period 2 are respectively

$$U_1(C_1, C_2) = \frac{1}{10} (C_1)^{-\frac{9}{10}} (C_2)^{\frac{1}{11}},$$

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$$U_2\left(C_1, C_2\right) = \frac{1}{11}\left(C_1\right)^{\frac{1}{10}}\left(C_2\right)^{-\frac{10}{11}}.$$

We compute the optimal consumption plan by equating the marginal rate of intertemporal substitution of consumption to the slope of the intertemporal budget constraint:

$$-\frac{U_1\left(C_1, C_2\right)}{U_2\left(C_1, C_2\right)} = -\left(1 + r_1\right) \tag{1}$$

$$-\frac{11}{10}\left(C_1\right)^{-\frac{10}{10}}\left(C_2\right)^{\frac{11}{11}} = -\left(1 + 0.10\right)$$

$$\frac{11}{10}\frac{1}{1.10} = \frac{C_1}{C_2}$$

$$C_1 = C_2.$$

We plug this condition into the intertemporal budget constraint (IBC)

$$C_1 + \frac{C_2}{1 + r_1} = \left(1 + r_0\right)B_0^* + Q_1 + \frac{Q_2}{1 + r_1} \tag{2}$$

to find the optimal consumption levels for periods 1 and 2:

$$C_1 + \frac{C_1}{1.10} = 1.20\left(-5\right) + 10 + \frac{10}{1.10}$$

$$C_1 = 6.86 = C_2.$$

We compare these with the endowments to compute the trade balances in each period:

$$TB_1 = Q_1 - C_1 = 10 - 6.86 = 3.14,$$

$$TB_2 = Q_2 - C_2 = 10 - 6.86 = 3.14.$$

Therefore, the net foreign asset position at the end of period 1 is

$$B_1^* = \left(1 + r_0\right)B_0^* + TB_1$$
$$= 1.2\left(-5\right) + 3.14$$
$$= -2.86.$$

Now we are in a position to calculate the current account balances:

$$CA_1 = r_0 B_0^* + TB_1 = 0.20\left(-5\right) + 3.14 = 2.14,$$

$$CA_2 = r_1 B_1^* + TB_2 = 0.10\left(-2.86\right) + 3.14 = 2.85.$$

(b) Now we have $Q_1 = 10$ and $Q_2 = 15$. We combine conditions (1) and (2) again:

$$C_1 + \frac{C_1}{1.10} = 1.20\left(-5\right) + 10 + \frac{15}{1.10}$$

$$C_1 = 9.24 = C_2.$$

We calculate the trade balance, net foreign assets and the current account balance just like before:

$$TB_1 = Q_1 - C_1 = 10 - 9.24 = 0.76,$$

$$TB_2 = Q_2 - C_2 = 15 - 9.24 = 5.76.$$

Therefore, the net foreign asset position at the end of period 1 is

$$B_1^* = (1 + r_0) B_0^* + TB_1$$
$$= 1.2\,(-5) + 0.76$$
$$= -5.24.$$

Now we are in a position to calculate the current account balances:

$$CA_1 = r_0 B_0^* + TB_1 = 0.20\,(-5) + 0.76 = -0.24,$$

$$CA_2 = r_1 B_1^* + TB_2 = 0.10\,(-5.24) + 5.76 = 5.24.$$

The repayment of the initial debt is postponed under this endowment stream: the country runs a smaller trade surplus in period 1 and a larger trade surplus in period 2. Accordingly, it runs a current account deficit in period 1 and a much larger surplus in period 2.

(c) We plug B_0^* into (2) and solve:

$$C_1 + \frac{C_1}{1.10} = 0 + 10 + \frac{10}{1.10}.$$

We find

$$C_1 = C_2 = 10,$$
$$TB_1 = TB_2 = 0,$$
$$CA_1 = CA_2 = 0.$$

Since the desired consumption plan coincides with the endowment now, there is no need for intertemporal trade with the rest of the world: the country runs trade and current account balances in both periods.