

Problem Set 3

Current Account Sustainability

Due: Thursday, October 21st, before the class

Question 1: Current Account Determination

Consider the effects of an hurricane Laura in Haiti. This natural disaster caused a significant temporary fall in output. Suppose Haiti used the international financial market to smooth consumption subject to its intertemporal resource constraint as in the two-period model presented in Lecture 28. What would be the effects of the hurricane on the following variables, relative to the value if there had been no hurricane?

- (a) consumption in the year of the hurricane
- (b) current account balance in the year of the hurricane
- (c) net investment income in the year after the hurricane
- (d) consumption in future periods (second period of the model)
- (e) current account balance in future periods (second period of the model)

Compare the above results to the case Haiti had no access to international financial market. What would have happened to consumption, current account and investment income in the year of the hurricane and thereafter?

Question 2: Current Account Determination

Consider the two-period economy consumption-smoothing model. Suppose the economy starts with zero net foreign asset, and people want the same consumption in the two periods. Initially, output is equal in the two periods (and so is planned consumption) but in period 1 a new technology is discovered that will make output double in period 2. How do consumption, the trade balance and the current account change in period 1?

- a) How do consumption and the trade balance change in period 1 following the discovery of the new technology compared to the initially planned values?
- b) How do planned consumption, the trade balance and the current account for period 2 change following the discovery compared to the initially planned values?
- c) What happens to consumption in period 2 (compared to the initially planned value) in the case the new technology does not work and output does not change?

Question 3: Intertemporal Approach to CA

This problem was given in the Fall 2018 midterm

Consider a small open economy with capital that has zero foreign assets and liabilities and a balanced current account. Suppose consumption is determined as in the Intertemporal Approach to the Current Account presented by Obstfeld and Rogoff (1996) with a

quadratic utility function, so that:

$$C_t = rB_{t-1} + \frac{r}{1+r} \sum_{i=0}^{\infty} \frac{1}{(1+r)^i} E_t[Y_{t+i} - I_{t+i}]$$

where $Y_{t+i} = A_{t+i}F(K_{t-1+i})$ and there is no government.

- (a) Suppose productivity, A_t , unexpectedly increases in period t . Under which condition does this productivity shock improve the current account (i.e. lead to a surplus)? Assuming that such condition holds, will the current account show a surplus or a deficit or be balanced in the medium run, after productivity and capital will have come back to their initial values $A(t-1)$ and $K(t-1)$? Explain.
- (b) Now suppose that in period t , economic agents expect productivity to increase starting with period $t+1$. How do investment, consumption and the current account change because of these optimistic expectations? How is the net international investment position affected by such changes?
- (c) What happens in period $t+1$ if no productivity shock takes place, so that $A_t = A_{(t+1)}$ and agents realize that their expectations were wrong? How do investment, consumption and the current account change in period $t+1$? In particular, does consumption go back to its initial value, and why? [Hint: to answer the last question consider the consumption function (1) at period $t+2$].

Question 4: Intertemporal Approach to CA

This problem was given in the Fall 2016 midterm

Consider the Intertemporal Approach to the Current Account presented by Obstfeld and Rogoff (1996). Suppose there is no capital/investment and no government consumption. Recall that with quadratic utility consumption is equal to Permanent Income Consumption:

$$C_t = rB_{t-1} + \bar{Y} + \frac{r}{1+r} \sum_{i=0}^{\infty} \frac{1}{(1+r)^i} E_t[Y_{t+i} - \bar{Y}]$$

The stochastic process for output is defined as

$$Y_{t+1} - \hat{Y} = \rho(Y_t - \hat{Y}) + \epsilon_{t+1}$$

so that

$$E_t[Y_{t+i} - \bar{Y}] = \rho^i[Y_t - \bar{Y}]$$

- (a) Find consumption C_t and the current account CA_t as functions of the current shock ϵ_t .
- (b) Assume $0 < \rho < 1$. What is the effect on the current account of an unanticipated positive shock to output, ϵ_t ? How does such effect vary with the persistence of the shock, ρ ?

Question 5: Intertemporal Approach to CA

Consider a small open economy without capital that has no foreign assets and liabilities (NIIP=0), and starts from a balanced current account (CA=0). Consumption is determined as in the Intertemporal Approach by Obstfeld and Rogoff (1996) when the utility function is quadratic:

$$C_t = rB_{t-1} + \bar{Y} + \frac{r}{1+r} \sum_{i=0}^{\infty} \frac{1}{(1+r)^i} E_t[Y_{t+i} - \bar{Y}]$$

The stochastic process for output is defined as

$$Y_{t+1} - \hat{Y} = \rho(Y_t - \hat{Y}) + \epsilon_{t+1}$$

so that

$$E_t[Y_{t+i} - \bar{Y}] = \rho^i[Y_t - \bar{Y}]$$

- (a) Find consumption C_t and the current account CA_t as functions of the current shock ϵ_t .
 - Even if you did not solve point a), answer the following questions by reasoning (no need for calculations).
- (b) Which type of shocks (temporary or permanent) lead to a significant change in the current account balance? And what shocks do not affect the current account? Explain. [Remember we have no capital]
- (c) Now (remember $CA = 0, NIIP = 0$), suppose a negative permanent shock, $\epsilon_t < 0$, hits the economy at time t , but it is erroneously believed to be temporary, i.e. to last only one period. What is the effect of such shock on consumption, the current account and the international investment position at time t ? What happens at time $t + 1$ when the agents realize that the shock was permanent? How does consumption change? How is the current account at time $t + 1$? Zero, positive or negative? How is the trade balance?

Question 6: The Log Utility:

Consider the model in Obstfeld and Rogoff (1996) in the deterministic case (there is no uncertainty). Suppose that the one-period utility function is logarithmic, i.e. $u(C_s) = \log(C_s)$, and that $\beta(1+r) \neq 1$.

- (a) Solve the maximization problem and derive the consumption function. Discuss the implication for consumption of $\beta(1+r) \neq 1$.
- (b) Derive the current account in terms of deviations of output, investment and government consumption from their permanent level in the case the consumption function is as in part (a).