EC201 Macroeconomics 2, Term 1 2025
University of Warwick
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Support and Feedback Class 3 (week 5)
Intertemporal Theory of the Current Account
Current Account Adjustment to Shocks

A. Pre-Class Review Questions

1. **News Shocks:** Indicate weather the following statement is true, false or uncertain. Explain your reasoning.

   Good news about future productivity leads to a trade deficit today.

2. **Debt Forgiveness:** Consider a small open economy where households live for two periods and have logarithmic preferences,

   $$\ln C_1 + \beta \ln C_2,$$

   where the subjective discount factor β equals $\frac{10}{11}$. Suppose that households receive a constant endowment over time equal to 10, $Q_1 = Q_2 = 10$. Suppose that households start period 1 with debt including interest equal to 5, $(1 + r_0)B_0 = -5$ and that $r_0 = 0.1$. Finally, assume that the country enjoys free capital mobility and that the world interest rate is 10 percent, $r^* = 0.1$.

   (a) Calculate the equilibrium values of consumption, the trade balance, and the current account in period 1.

   (b) Suppose now that foreign lenders decide to forgive all of the country's initial external debt including interest. Calculate the effect of this external gift on consumption, the trade balance, and the current account in period 1. Provide an intuitive explanation of your findings.

B. In-Class Questions

1. **Import Tariffs** Consider a two-period open economy in which households have preferences given by

   $$\ln C_1 + \ln C_2,$$

   where C_1 and C_2 denote consumption of food in periods 1 and 2, measured in tons. The country does not produce food. Households are endowed with Q_1 and Q_2 barrels of oil in periods 1 and 2. In both periods, a barrel of oil sells for one ton of food in international markets. The economy starts period 1 with no assets, $B_0 = 0$. The world interest rate is r^* and there is free capital mobility. The government imposes tariffs on food imports in periods 1 and 2, denoted τ_1 and τ_2, and rebates the revenue generated by the tariffs to the public using lump-sum transfers, denoted L_1 and L_2.

   (a) What are the terms of trade in periods 1 and 2?

   (b) Derive the household's intertemporal budget constraint.

   (c) Write down the optimization problem of the household.

(d) Derive the first-order conditions of the household's optimization problem.

(e) Write down the intertemporal constraint of the government in periods 1 and 2.

(f) Combine the household's intertemporal budget constraint with the government budget constraints to find the economy's intertemporal resource constraint in equilibrium. Do the policy variables τ_1, τ_2, L_1, or L_2 appear in this constraint? Why?

(g) Let $Y \equiv Q_1 + Q_2/(1 + r^*)$ denote the present discounted value of the endowment path. Express the equilibrium values of consumption in periods 1 and 2 in terms of Y, r^*, τ_1, and τ_2.

(h) Write the equilibrium trade balance in period 1 in terms of Y, r^*, Q_1, τ_1, and τ_2. Compare the trade balance under free trade, i.e., $\tau_1 = \tau_2 = 0$, to the following cases: (a) $\tau_1 = \tau_2 > 0$; (b) $\tau_1 > 0$ and $\tau_2 = 0$; and (c) $\tau_1 = 0$ and $\tau_2 > 0$.

(i) Define $x = \dfrac{1 + \tau_1}{1 + \tau_2}$. Use the equilibrium values of C_1 and C_2 derived in part (g) to eliminate these two variables from the household's utility function. Find the value of x that maximizes the household's welfare. Interpret your result.

C. Self-study Questions

1. **World Interest Rate Shock:** Consider an individual who lives for two periods, $t = 1, 2$. Her preferences for consumption in each period are described by the lifetime utility function $U(C_1) + U(C_2)$, where C_1 and C_2 denote consumption in periods 1 and 2 and

$$U(C) = \frac{C^{1-\sigma} - 1}{1 - \sigma}.$$

The parameter $\sigma > 0$ denotes the inverse of the intertemporal elasticity of substitution. Suppose that the individual starts period 1 with no financial wealth, $B_0 = 0$. Suppose further that the individual receives endowments of goods in the amounts Q_1 and Q_2 in periods 1 and 2. In period 1, the individual can borrow or lend at the interest rate r_1 via a bond denoted B_1.

(a) Find the optimal levels of consumption in periods 1 and 2 as functions of the individual's endowments, Q_1 and Q_2, the intertemporal elasticity of substitution $1/\sigma$, and the interest rate r_1.

(b) Find the optimal level of saving in period 1 as a function of the individual's endowments, Q_1 and Q_2, the intertemporal elasticity of substitution $1/\sigma$, and the interest rate r_1. Characterize conditions under which the individual will save in period 1; that is, conditions such that $S_1 > 0$. Provide intuition.

(c) Find the partial derivative of the optimal level of consumption in period 1 with respect to the interest rate r_1. Show that if $S_1 < 0$, then this derivative is negative; that is, an increase in the interest rate unambiguously lowers the optimal level of consumption in period 1. If $S_1 > 0$, characterize conditions on $1/\sigma$, r_1, Q_1, and Q_2 such that the substitution effect dominates the income effect; that is, conditions such that an increase in the interest rate r_1 reduces desired consumption in period 1. Provide an intuitive explanation of your answers.

(d) Show that when $\sigma = 1$, then the substitution effect always dominates regardless of the sign of S_1; that is, the optimal level of period 1 consumption always falls when the interest rate increases.