Seminar 4
ECON 4330

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1 Debt overhang and buy-backs

Consider a two-period representative agent model. The country we look at starts out with an initial level of debt D (exogenously given) which must be repaid in period 2. The world interest rate is assumed to equal zero ($r = 0$). For simplicity, we assume that the country is not able to borrow or lend anything extra from the world credit market.

Income in period 1 is exogenous and equal to Y_1, while income in period 2 is $A_2F(K_2)$, where A_2 is the (stochastic) level of productivity and K_2 is the capital stock. Assume complete depreciation. This means that K_2 is equal to the level of investment in period 1. A_2 can take values between A_L and A_U and has probabilty density function $\pi(A_2)$ with $E(A_2) = 1$.

When period 2 arrives, the country may *default*. In that case we assume that the country incurs a default cost $\eta A_2 F(K_2)$. Consequently, the country only repays the loan if the default cost exceeds D.

1. Let $V(D, K_2)$ be the *market value* of D in period 1. Explain why

$$V(D, K_2) = \eta F(K_2) \int_{A_L}^{\frac{D}{\eta F(K_2)}} A\pi(A)dA + D \int_{\frac{D}{\eta F(K_2)}}^{A_U} \pi(A)dA$$

2. The value V depends on K_2, i.e., it depends on how much the country decides to invest. Assume that the country chooses K_2 to maximize $F(K_2) - K_2 - V(D, K_2)$. Find the first-order condition for optimal K_2. Give it an interpretation. HINT: Use the Leibniz rule.

3. The first-order condition implicitly defines optimal K_2 as a function of D, $K(D)$. We will take for granted that $K' < 0$ (this is cumbersome to show). What does this mean in economic terms?

4. Use the preceding answer to give intuition for why V is a *concave* function in D, once you take into account how K_2 depends on D.

5. Now we want to evaluate the possibility of debt buybacks. We imagine a scenario where a country observes that its debt is traded at low values in the credit market. Can it be a good idea to purchase its own debt at a low value in period 1, rather than waiting for maturity in period 2? Let Q be the face value of the debt the country decides to re-purchase. We assume the country maximizes its expected net income:

$$Y_1 - K_2 + F(K_2) - pQ - V(D - Q, K_2)$$

where p is the *market price* of the debt. If Q must be determined before optimal investment, we know that K_2 is given by $K(D - Q)$. Further, if Q must be officially announced before it is bought and since p is the price of debt traded in a rational market, we know that the market price must equal

$$p = \frac{V(D - Q, K(D - Q))}{D - Q}$$

i.e. the price the government must pay for its debt is affected by how much it decides to buy.

   - Without doing any differentiation, discuss what effects a debt buy-back will have on the country's expected net income.

2 Defects and debts

1. Explain briefly how the current account of the balance of payments is defined.

2. Can a country continue to have current account deficits forever?

3. Can a country have trade balance deficits forever?

4. Suppose you have the following information from the country's national accounts:

   (a) Net foreign debt : 80 per cent of GDP

   (b) Trade surplus: 2 per cent of GDP

   (c) Current account surplus: - 2 per cent of GDP

   (d) Surplus on the interest account - 4 per cent of GDP

(e) Inflation rate 2 per cent per year

(f) Real GEP growth per year 1 per cent

Will the nominal value of the foreign debt be increasing? Will the real value be increasing? Will the ratio of debt to GDP be increasing?

5. Use the simple risk premium model from class. Find the interest rate Greece pay on their sovereign debt. Find also a risk free alternative, ex. Germany, and use the model to see how likely the market think a Greek default is. How may the answer be different? What does the model miss?