

Supervision 8 International Financial Crises

Problems

1. Consider the following model of sovereign debt crises. For each period, domestic public debt B_{t+1} issued in period t consists of one-period zero-coupon bonds that are held entirely by domestic residents. Domestic agents can invest in international risk-free one-period zero-coupon bonds at the price $Q_t^* = 1/R$, or in domestic public debt at the market price Q_t , which may differ from Q_t^* because of expectations of default. For simplicity, assume that the international (gross) risk-free interest rate equals $R = 1$, so that $Q_t^* = 1$. All investors are risk neutral and do not discount the future, so the price of an asset is equal to its expected cash flow.

If the government defaults on its bonds, the ‘haircut’ imposed on the bond holders is 50%, so the ‘recovery rate’ is 50%. It is common knowledge that there is a threshold \hat{B} such that for $B_{t+1} \geq \hat{B}$, the government will default on its bonds in period $t + 1$ if the economy is in a recession. Suppose that $\hat{B} = 115$ in all periods, and that the government financing need in the initial period t is equal to 100. In each period $t + 1, t + 2, \dots$, a recession occurs with probability $1/5$.

- (a) Calculate the equilibrium price at which the domestic government bonds are issued in period t . Explain whether the equilibrium is unique. How much debt B_{t+1} does the government issue?
- (b) Suppose that in period $t + 1$ the government runs a primary deficit of 5. Given B_{t+1} from part (a), explain the price Q_{t+1} at which the government is able to issue its bonds in period $t + 1$.
- (c) Suppose now that in each period an international lender of last resort (ILLR) stands ready to buy domestic government bonds for 20 at a price $Q^{ILLR} = 1$. Explain how this changes your answer to part (b).
- (d) Now suppose instead that the government runs a primary deficit of 20 in period $t + 1$. Explain whether the ILLR of part (c) should intervene in this case.

2. Assume a country has a one-period external debt with face value equal to 100. Its debt is risky in the sense that the country is able to repay the full amount of 100 only if the economy is in a ‘good’ state of nature. In a ‘bad’ state of nature, investors know that the country will only be able to pay 25. The probability that the country will be in the good state is $1/3$.

- (a) Assuming that international investors (the creditors) are risk neutral, calculate the secondary market price of the country’s debt.

It is common knowledge that reducing total debt will improve the performance of the country. Namely, reducing debt from 100 to 80 at face value will raise the probability of the good state from $1/3$ to $1/2$. The government, the creditors and an international institution are contemplating different strategies to reduce the country’s debt.

- (b) Contrast the effects of the following strategies on the expected repayments and the secondary-market price of the country’s debt:
- i. The creditors forgive 20 of the country’s debt (at face value).
 - ii. An international institution buys a face value of 20 of the country’s debt from investors at the equilibrium secondary-market price, and forgives this debt.
- (c) Discuss the costs and benefits of each strategy for the government, the creditors and the international institution.

The government of the country proposes a ‘debt swap’, such that investors are given the option to exchange existing bonds with new ‘safe’ debt at a non-negotiable predetermined ‘swap rate’. The new bonds have seniority (i.e. will be paid first) and their issuance is capped to make sure that they will always be paid out at face value. While a debt swap is usually detrimental to creditors, the government claims that the swap will actually favor them, because by reducing debt overhang, it will raise the probability of the good state from $1/3$ to $1/2$.

- (d) Calculate the swap rate, the stock of old debt that remains in the market after the swap, and the gains/costs for the debtor and the creditors, assuming that the swap will indeed raise the probability of the good state to $1/2$. Explain whether creditors will oppose the debt swap.

Essay question (1000 words max.)

3. Discuss to what extent the euro area is an incomplete monetary union, and what lessons can be drawn from its experience following the financial crisis.

Main readings

- De Grauwe (2014), *The Economics of Monetary Union*.
- Krugman, Obstfeld and Melitz (2014), *International Economics: Theory and Policy*, ch 20-22.

Supplementary references

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- Wyplosz (2002) "Fiscal Policy: Institutions versus Rules", CEPR Discussion Paper 3238.