

# Macroeconomics Analysis II, EC3102

## Tutorial 1

### Question 1. *Government and Credit Constraints in the Two-Period Economy.*

Consider again our usual two-period consumption-savings model, augmented with a government sector. Each consumer has preferences described by the utility function  $u(c_1, c_2) = \ln c_1 + \ln c_2$ , where  $\ln$  stands for the natural logarithm,  $c_1$  is consumption in period one, and  $c_2$  is consumption in period two.

Suppose that both households and the government start with zero initial assets (i.e.,  $a_0 = 0$  and  $b_0 = 0$ ), and that the real interest rate is always 10 percent. Assume that government purchases in the first period are one ( $g_1 = 1$ ) and in the second period are 9.9 ( $g_2 = 9.9$ ). In the first period, the government levies lump-sum taxes in the amount of 8 ( $t_1 = 8$ ). Finally, the real incomes of the consumer in the two periods are  $y_1 = 9$  and  $y_2 = 23.1$ .

- a) What are lump-sum taxes in period two ( $t_2$ ), given the above information?
- b) Compute the optimal level of consumption in periods one and two, as well as national savings in period one.
- c) Consider a tax cut in the first period of 1 unit, with government purchases left unchanged. What is the change in national savings in period one? Provide intuition for the result you obtain.
- d) Now suppose again that  $t_1 = 8$  and also that credit constraints on the consumer are in place, with lenders stipulating that consumers cannot be in debt at the end of period one (i.e., the credit constraint again takes the form  $a_1 \geq 0$ ). Will this credit constraint affect consumers' optimal decisions? Explain why or why not. Is this credit constraint welfare enhancing, welfare-diminishing, or welfare-neutral?
- e) Now with the credit constraint described above in place, consider again the tax cut of 1 unit in the first period, with no change in government purchases. (That is,  $t_1$  falls from 8 units to 7 units.) What is the change in national savings in period one that arises due to the tax cut? Provide economic intuition for the result you obtain.