

## Question 1: A Macroeconomics Potpourri (25 points)

- a. Consider a small open economy where GDP consists of household consumption, investment, government expenditure and net exports (current account). Using Mankiw's simple model of an open economy, illustrate in a diagram what happens to the country's net exports if there is a cut in government expenses in the rest of the world (a big foreign country). (8 points)
- b. Using the concepts of Ljungqvist's and Sargent's model, explain why higher productivity uncertainty for workers (higher "turbulence") can lead to longer unemployment spells and a higher unemployment rate. Discuss whether the introduction of an Earned Income Tax Credit can counteract the effect of higher turbulence. (7 points)
- c. Consider a country (a closed economy) where production is given by the function

$$Y_t = K_t^\alpha L_t^{1-\alpha}$$

where  $Y$  is total production (GDP),  $K$  is capital,  $L$  is the labor force, and  $\alpha$  is a parameter with value between zero and one.

- (i) Derive the following equation (approximation) that decomposes GDP growth (3 points):

$$\frac{\Delta Y}{Y} = \alpha \frac{\Delta K}{K} + (1 - \alpha) \frac{\Delta L}{L}$$

- (ii) Assume that savings in physical capital in the economy is given by  $s \cdot Y_t$  where  $s$  is a parameter with value between zero and one. Also assume that the depreciation rate of the capital stock equals  $\delta$ . Assume that the labor force is not growing so that you can normalize it to one,  $L_t = 1$  in all years. Derive an expression for the steady state level of capital as a function of  $\delta$ ,  $s$  and  $\alpha$ . (3 points).
- (iii) Suppose you meet with government officials of the country who claim that they wish to increase the savings rate in the economy (increase  $s$ ). From a theoretical perspective, is this necessarily the right thing to do? For a given  $\alpha$ , what is the optimal  $s$ ? Assuming that  $s$  turns out to be too low in your view and that  $s$  is increased once and permanently, depict the dynamics over time of output, consumption and investment in the transition between the old and the new steady state (4 points).

## Question 2: The AA-DD model (25 points)

Use the AA-DD model in Krugman-Obstfeld-Melitz to answer the following questions. Use diagrams to illustrate your answers!

- a. Assume that the country has a flexible exchange rate. Illustrate the effects on output (GDP), the price level, the interest rate in the money market, and the exchange rate of a temporary fiscal expansion. Then do the same for a permanent fiscal expansion. Make sure to explain the economic mechanisms. (8 points)

- b. As in part (a), assume that the country has a flexible exchange rate. Illustrate the effects on output (GDP), the price level, the interest rate in the money market, and the exchange rate of a temporary monetary expansion. Then do the same for a permanent monetary expansion. Make sure to explain the economic mechanisms. (8 points)
- c. Suppose instead that the economy is maintaining a fixed exchange rate, but that financial markets are starting to doubt the central bank's ability to maintain this regime. Show how expectations of a devaluation will affect the economy. What can the central bank do to defend the fixed exchange rate? If the outflow of capital continues, are there any constraints on the central bank's capacity to defend the fixed exchange rate? (9 points)

### Question 3: Fractional Reserve Banking and the Money Supply (20 points)

The money supply is affected by the central bank, the banking system and the behavior of depositors.

- a. Consider the following balance sheet of the economy's largest private bank:

| Private Bank's Balance Sheet |     |             |      |
|------------------------------|-----|-------------|------|
| Assets                       |     | Liabilities |      |
| Reserves                     | 100 | Deposits    | 1000 |
| Loans                        | 900 |             |      |

- Suppose the private bank holds as little reserves as it is allowed to by regulation. What is then the regulatory requirement on the reserve-deposit ratio? (5 points)
- b. Assume that the value of notes and coins circulating in the economy is equal to 1000. Do you have reason to believe that the money supply (M1) in the economy is greater than 1000? Greater than 2000? Does it depend on the reserve-deposit ratio? How? A precise answer (using some math) is required for full points but intuitive reasoning takes you far. (6 points)
- c. Consider the following statement: "A central bank has free and unlimited access to liquidity. It can provide unlimited support to banks in its own currency at times of a banking crisis". Use the balance sheet of a central bank and a central bank's relation to private banks to illustrate whether the statement is true or not. (6 points)
- d. Suppose that the economy enters a recession and that the central bank slashes its policy rate to zero but finds it to be inadequate. At that point, which kinds of unconventional policy measures can the central bank undertake? Is it likely to affect the monetary base and broader measures of money supply (M1, M2) equally much? (3 points)

## Question 4: Financial Crises (20 points)

This is an essay question. While you are only expected to verbally answer the questions below, still try to use sound economic reasoning and concepts for economic policy making discussed in lectures and seminars. **Your total answer should not exceed 4 pages.**

- a. **Please write no more than 2 pages. Try to be brief and to the point.**  
In chapter 20 of Mankiw's text book, six common features of a financial crisis are listed. Describe these features. For the first five features, substantiate the description by adding examples of particular phenomena or events from the U.S. experience between the mid 2000s to 2009. (12 points)
- b. **Please write no more than one and a half pages.** In both lecture 9 and lecture 10 (Lars Hörngren's guest lecture) we covered the Swedish crisis of the 1990's and the financial crisis of 2008-2009. Outline some similarities and differences in how the two crises affected Sweden and in particular its financial system. How did policy makers (the Ministry of Finance, The Swedish National Debt Office, the Riksbank) respond in the 1990's and in 2008-2009? Did Sweden have a solid legislation for bank resolution (rescue) in place in the summer of 2008? (5 points)
- c. **Please write no more than half a page.** Aside from unconventional monetary policy measures (such as quantitative easing), the Federal Reserve Bank (the U.S. central bank) undertook several unconventional policy measures to restore financial stability during the financial crisis. Describe how the Fed supported banks as well as other financial institutions. Please be precise. (3 points)

## Question 5: The AA-DD versus DAD-DAS model (10 points)

**Credit question. This question should only be answered by students who have not obtained credit from the seminar series.**

In the lectures we have covered the AA-DD model of Krugman et al.'s text book as well as the DAD-DAS model of Mankiw's text book.

- a. Describe the main economic actors and markets in each model. (4 points)
- b. Are there differences in the characterization of the short-term equilibrium? Are there differences in the (microeconomic) assumptions? Which ones? (3 points)
- c. For the following three policy settings which model would you prefer to choose? Briefly motivate your choice. (3 points)
  - (i) The analysis of a one-time temporary increase in government spending (fiscal expansion) in a small open economy.
  - (ii) The analysis of the consequences of a too "hawkish" central bank (a central bank that for some time penalizes inflation too much).

- (iii) A permanent legal ban on firms' ability to adjust prices frequently (say more than once every third year or so), combined with a permanent one-time increase of the money supply.