



Stockholm
University

Department of Economics

Course name: Intermediate Macroeconomics
Course code: EC2201
Type of exam: Main
Examiner: Anna Seim
Number of credits: 7,5 credits
Date of exam: Sunday March 18 2018
Examination time: 5 hours (09:00-14:00)

Write your exam identification number on each answer sheet (the number stated in the upper right hand corner on your exam cover).

Explain notions/concepts and symbols. If you think that a question is vaguely formulated, specify the conditions used for solving it. Only legible exams will be marked. **No aids are allowed.**

Question 4 may be answered in English or Swedish. All other questions should be answered in English.

Only students who have not received course credit from the seminar exercises should answer Question 5. Students who have obtained course credit automatically receive 10 points on that question and get no extra points from answering it.

The exam consists of 5 questions, worth 100 points in total. For the grade E 45 points are required, for D 50 points, C 60 points, B 75 points and A 90 points.

Your results will be made available on your Ladok account (www.student.ladok.se) within 15 working days from the date of the examination, on April 6 at the latest.

Good luck!

Question 1: Short questions (25 points in total)

Please write no more than one page when answering each of these questions.

- a. Explain how the nominal exchange rate is determined according to the monetary approach to the exchange rate. (5 points)
- b. Consider a household living for two periods. The intertemporal budget constraint is given by

$$c_1 + \frac{c_2}{1+r} = y_1 + \frac{y_2}{1+r},$$

where c is consumption, y is income and r is the interest rate. The household's preferences are characterised by the utility function

$$U(c_1, c_2) = \ln c_1 + \beta \ln c_2,$$

where $\beta < 1$ is the discount factor. Derive the Euler equation. (5 points)

- c. Consider the bathtub model of unemployment. Let L denote the constant labour force, let E denote employment and let U denote unemployment. The job-finding rate is denoted f and that the job-separation rate is denoted s . Derive an expression for the unemployment rate. (5 points)
- d. In recent years, many inflation targeting central banks have been struggling with inflation being too low, and some even with deflation. Explain why deflation may be a problem. (5 points)
- e. In the Pissarides search and matching model, the equilibrium is characterised by the following three equations:

$$u = \frac{\lambda}{\lambda + \theta q(\theta)},$$

$$p - w = \frac{(r + \lambda)pc}{q(\theta)},$$

$$w = (1 - \beta)z + \beta p(1 + c\theta),$$

where u is unemployment, θ is labour market tightness and w is the wage. The notation for the parameters of the model is the same as in Lecture 3.

Analyse the effect of a decrease in unemployment benefits, z . (5 points)

Question 2: The AS-AD model (20 points)

Consider the AS-AD model discussed in the course. Assume, initially, that the real interest rate only affects domestic investment.

- Write down the expressions for the AS and AD curves and interpret the expressions. What must be true of the model parameters and variables in the long-run equilibrium, i.e. in the steady state? (6 points)
- Analyse the effects of a supply shock that causes a decrease in inflation, preferably using a diagram. Assume that the shock lasts for one period and then assumes the value zero. Describe the mechanisms that brings the economy back to long-run equilibrium. What happens to aggregate demand? (5 points)
- Now assume that net exports, NX_t , as a fraction of potential GDP, \bar{Y}_t , are determined by the following equation:

$$\frac{NX_t}{\bar{Y}_t} = \alpha_{NX} - \beta_{NX}(r_t - r_t^*),$$

where r_t is the real interest rate and * denotes foreign. Explain the intuition behind this expression. (4 points)

- Derive the IS-curve when net exports are determined as in question c above. (5 points)

Question 3: Economic growth (25 points)

Consider a version of the Solow model where population grows at the constant rate $n > 0$ and labour efficiency grows at rate g . Capital depreciates at rate δ each period and a fraction s of income is invested in physical capital every period. Assume that the production function is given by:

$$Y_t = K_t^\alpha (L_t E_t)^{1-\alpha},$$

Where $\alpha \in (0,1)$, Y_t is output, K_t is capital, L_t is labour and E_t is labour efficiency.

- Show that the production function exhibits constant returns to scale, i.e. is homogenous of degree 1. (3 points)
- Derive an expression for the accumulation of capital per worker in this economy, i.e. Δk_{t+1} where $k_t \equiv K_t/L_t E_t$. (9 points)
- What is the steady-state condition in this economy? Explain the intuition behind the equilibrium condition and illustrate the steady state in a diagram. (6 points)
- What happens to capital and output per worker if the capital depreciation rate increases? Illustrate your answer in a diagram. (5 points)
- What is the steady state growth rate of $y_t \equiv Y_t/L_t E_t$? (2 points)

Question 4: Government deficits and debt (20 points)

This is an essay question where you are expected to refer to economic theories and concepts used in the course. Please be brief and to the point. Write no more than 3 pages (maximum). Only legible answers will be considered.

Your task is to discuss the following:

- Are fiscal deficits and government debt a problem? Why/why not?
- What advice would you give a heavily indebted government?

Question 5: (10 points)

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

Consider an economy that is characterised by the following Phillips curve:

$$u = \bar{u} - \theta(\pi - \pi^e),$$

where u is unemployment, \bar{u} is the natural rate of unemployment, π is inflation, π^e is inflation expectations and $\theta > 0$ is a parameter. Suppose that the loss function of the central bank is given by:

$$L(u, \pi) = \gamma u + \pi^2.$$

where $\gamma > 0$ is a parameter. Agents are assumed to be rational and form their expectations prior to the central bank setting monetary policy.

- a. Describe the equilibrium in this economy if the central bank commits to $\pi = 0$ and is believed by the public. (2 points)
- b. Compute optimal monetary policy under discretion. What is unemployment under this policy? (5 points)
- c. Compute the central bank's loss under commitment to zero inflation and under discretion. (3 points)