# Written Exam for the B.Sc. in Economics summer 2012

## Macro B

## Final Exam

June 23 2012
(3 hours closed-book exam)

Please note that the language used in your exam paper must correspond to the language of the title for which you registered during exam registration. I.e. if you registered for the English title of the course, you must write your exam paper in English. Likewise, if you registered for the Danish title of the course or if you registered for the English title which was followed by "eksamen på dansk" in brackets, you must write your exam paper in Danish.

If you are in doubt about which title you registered for, please see the print of your exam registration from the students' self-service system.

All questions of both problems should be answered

**Problem A**

This exercise ask you to analyze the economic rationale for stabilization policies. Assume that the utility function of the representative consumer takes the form

$$U(C,L) = \frac{1}{1-\theta}C^{1-\theta} - \frac{1}{1+\mu}L^{1+\mu}, \qquad \theta, \mu > 0 \tag{A.1}$$

where $C$ denotes consumption and $L$ denotes labor supply. The consumer is restricted by the budget constraint

$$C = \frac{W}{P}(1-\tau)L + I \tag{A.2}$$

where $W$ is the nominal wage $P$ is the price level, $I$ is non-labor income and $\tau$ is the tax rate on labor income; $0 \leq \tau < 1$.

1. Describe the consumer's preferences and the budget constraint. In particular, describe how taxation of labor income affects the consumers valuation of income and leisure.

2. The consumer is choosing $C$ and $L$ in order to maximize utility while taking $(A.2)$ into account. Show that the first order condition for maximizing utility may be stated

$$\frac{W}{P}(1-\tau) = L^{\mu}C^{\theta} = -\frac{U_L}{U_C} = MRS \tag{A.3}$$

3. Describe the relationship $(A.3)$ and in particular interpret $MRS$. Explain why $(A.3)$ implicitly describes the labor supply. Draw the relationship between $\frac{W}{P}$ and $L$ described by equation $(A.3)$ in a diagram where you have $L$ on the first axis and $W/P$ on the second axis. Why does the labor supply curve slope upwards? How does an increase in the tax rate $\tau$ affect labor supply? Illustrate in the diagram.

Now assume that the aggregate production function takes the form

$$Y = BL^{1-\alpha}, \qquad 0 < \alpha \leq 1 \tag{A.4}$$

Also assume that we may abstract from savings and investments and that any tax revenue is transferred back to the consumers so that $C = Y$ . Finally assume that product markets may be characterized by imperfections so that the price setting behavior by profit maximizing firms implies that

$$P = m^P MC = m^P \frac{W}{MPL} \tag{A.5}$$

where $m^P \geq 1$ is the mark-up factor on product markets. and $MPL = dY/dL$ is the marginal product of labor.

4. Explain why price setting is determined by $(A.5)$. Explain why the relationship $(A.5)$ implicitly describes labor demand and draw the labor demand curve in a diagram where you have $L$ on the first axis and $W/P$ on the second axis.

   Explain why the labor demand curve is downward sloping and explain how imperfections at the product market affect the position of the labor demand curve?

5. In equilibrium labor demand and labor supply are equal. Compare employment in equilibrium in the following 2 situations by drawing the labor supply curves and the labor demand curves found in question 3. and 4. in the same diagram (that is in total 4 curves) in case

   - there are no distortions in the economy, *i.e.* $\tau = 0$ and competition on product markets is perfect $m^P = 1$
   - there are distortion in the economy, *i.e.* $\tau > 0$ and competition on product markets is imperfect $m^P > 1$.

   Denote equilibrium employment in case a) $L^e$(efficient) and denote equilibrium employment in case b) $\bar{L}$ (the natural employment).

   Why is natural employment in case of distortions $\bar{L}$ lower than the efficient equilibrium employment $L^e$ (where there are no distortions); $\bar{L} < L^e$?

6. Assume that employment fluctuates around $\bar{L}$. When the economy is booming employment increases by $\Delta L$ whereas employment drops by exactly the same amount when the economy is in recession. We assume that $\bar{L}+\Delta L < L^e$ Using the diagram found in question 5 above illustrate and explain why the welfare loss when the economy is in recession is larger than the welfare gain when the economy is booming. Does this give a rationale for stabilizing the economy at $\bar{L}$? Explain. Finally, explain why it could be tempting for economic policymakers to strive for an employment above $\bar{L}$?

The short run aggregate supply function can (ignoring stochastics and assuming static expectations) be written as

$$\pi = \pi_{-1} + \gamma(y - \bar{y})$$

7. What is the effect on inflation of a policy that drives employment above the natural level; $L > \bar{L}$. Explain. Does it seem attractive? Explain. If anything what can policy makers do in order to obtain a sustainable higher level of employment?

**Problem B**

1. Why is Ricardian equivalence unlikely to hold in practice?

2. In the text book it is shown that in a closed economy the optimal monetary policy for a central bank under the ideal conditions (the central bank is a) perfectly informed, b) perceived fully credible by and c) is able to adjust interest rates instantaneously) responds directly to the specific shocks that hit the economy Why should the ideal monetary policy rate not respond to gaps in inflation and output. Should demand shocks be perfectly stabilized? Should supply shocks? Explain.

3. Assume the domestic government permanently expands public consumption. Illustrate and explain the long run effects of this policy on the real exchange rate.