

Name: \_\_\_\_\_

**Intermediate Macroeconomic Theory II, Fall 2007**

**Instructor: Dmytro Hryshko**

**Final Exam (40 points). December 17.**

**Notes: You should answer Questions 1,2, and 5; and one Question of your choice—3, or 4.**

1. **(10 points)** Suppose that firms that expect to increase production in the *future* have to increase their *current* transactions (e.g., they need to purchase more raw materials). For this reason, current real money demand rises when expected future output rises.
  - (a) **(3 points)** Under the assumption that real money demand depends on expected future output, use the *IS-LM* model to find the effects of an increase in expected future output on the price level. Suppose the effects of the increase in future output on current consumption and investment are small and can be ignored. (*Hint*: The *IS* is stable when the shock happens.) If the *Keynesian* economy is left to evolve by itself towards the long-run equilibrium, what would happen to the *future* aggregate price level? If the economy is *classical*, what happens to the *current* price level?

- (b) **(3 points)** Suppose that the Bank of Canada wants to stabilize the current price level immediately after the shock occurred, i.e., it changes the money supply to prevent changes in the aggregate price level when the shocks hit the economy. How will the Bank respond to the increase in expected future output?
- (c) **(2 points)** For this example, assuming that the expectations of the future output increase are satisfied, i.e. that output next period indeed increased, can you make the conclusion that the changes in the money supply caused the changes in output?
- (d) **(2 points)** Briefly describe the main message of the real business cycle theory. Does this example confirm the real business cycle theory?

2. (12 points) Use the *IS-LM* model to determine the short- and long-run effects of each of the following on the equilibrium values of the output, the real interest rate, consumption, investment, the price level, and the real money balances.

(a) (4 points) A fall in lump-sum taxes, with no change in government purchases. First consider the case in which the Ricardian equivalence holds. Briefly state the essence of Ricardian equivalence.

(b) (4 points) A fall in lump-sum taxes, with no change in government purchases. Now consider the case in which the Ricardian equivalence does not hold. Briefly state the reasons for why it may fail.

- (c) **(4 points)** A beneficial permanent *supply* shock affects most of the economy, but no individual firm is affected sufficiently to change its prices in the short run.

3. **(8 points)**(*Battle of the slopes.*) Some economists thought that fiscal policy should be used to alleviate the short-run economic fluctuations, and monetary policy should follow the fiscal policy adjusting the money stock appropriately to smooth the real interest rate in the economy. Others, like monetarists, argued that monetary policy and therefore changes in money supply, and not fiscal policy, is the main cause of short-run fluctuations. For all the questions to follow, assume that the central bank pursues the target of a constant real interest rate.

- (a) **(2 points)** Assume that investment is not sensitive to the real interest rate, and that the *LM* curve is upward sloping. Assume that a recessionary, real *IS*, shock, places the economy's equilibrium at the target real interest rate and output, below the full employment level of output. Draw the *IS-LM* schedule.

(b) (**2 points**) If the government wants to stabilize output, what kind of fiscal policy should it implement? When it implements the appropriate fiscal policy what happens to the real interest rate, and output? What is the response of the central bank, and how this response affects output and the real interest rate?

(c) (**2 points**) Now assume that the  $LM$  curve is derived from the classical quantity equation of money, when income velocity is constant. This is the kind of the  $LM$  curve monetarists envisioned. Assume now that the  $IS$  curve is downward sloping. Assume that there is an insufficient money supply in the economy so that the economy's output is below the full employment level of output. Draw the  $IS-LM$  schedule.

- (d) **(2 points)** If fiscal policy is used to stabilize output in the short run (*hint*: it may be ineffective, though), what happens to the real interest rate and output in the short run? What is the response of the central bank, and how this response affects output and the real interest rate?

4. **(8 points)** Suppose that the only shocks in the economy are changes in assessments of expected inflation  $\pi^e$ , and that the central bank is considering which policy to implement:

- keeping the money stock constant, or
- keeping the real interest rate constant.

Which policy leads to smaller fluctuations in real GDP in response to the economy's shocks? Draw the appropriate *IS-LM* schedule. (*Hint*: you may use the *IS-LM* schedule as in the textbook's discussion of the Great Depression, with the nominal interest rate on the vertical axis and real GDP on the horizontal axis.)

5. **(10 points)** Consider someone deciding how to allocate her consumption over two periods. She has utility function  $U(C_1, C_2) = \ln C_1 + \beta \ln C_2$ ,  $0 \leq \beta \leq 1$ .  $\beta$  is called the time discount factor, and measures how one values current consumption versus future consumption, or, in other words, one's impatience. (The lower the  $\beta$ , the more impatient you are, i.e., the more you value current consumption relative to future consumption, other things being equal.) Assume that income in the first period is  $Y_1$ , income in the second period is  $Y_2$ , and the real interest rate is  $r$ . (*Hint*: for this utility function,  $MU_1 = \frac{1}{C_1}$ , and  $MU_2 = \frac{\beta}{C_2}$ .) Assume that the real interest rate is  $r = 1/20$ , and  $\beta = \frac{1}{1+r}$ ; income in the first period is  $Y_1 = 82$ , in the second period is  $Y_2 = 41$ .

(a) **(7 points)** Solve for optimal consumption in each period. Determine the optimal savings in the first period of life.

(b) **(3 points)** Now suppose that, instead, the agent can save at the rate  $r$ , but is unable to borrow at all. Solve for the optimal agent's consumption in each period.