Examination:	**Macroeconomic Analysis (No. 1428)**
Semester:	Summer Semester 2007
Examiner:	Prof. Dr. Gerhard Schwödiauer
Time available:	120 min.
The following aids may be used:	None.

Examination Problems:

Part A and Part B are given the weight of one half each in the total grade.

> Please use separate sheets for solutions to Parts A and B.

Part A.

1. a) Assume that the aggregate behavior of an economy is given by

$$(IS) \qquad y_t = \bar{y} - a\,(r_t - \bar{r}) + v_t\,,$$

$$(LM) \qquad m_t - p_t = y_t - \lambda i_t + u_t\,,$$

$$(AS) \qquad p_t = E_{t-1}p_t + \gamma\,(y_t - \bar{y}) + s_t\,,$$

where s_t, u_t, v_t are white-noise shocks. Assume further that the real interest rate in *(IS)* is

$$r_t = i_t - E_t\ \pi_{t+1}$$

and that the central bank controls the nominal interest rate according to the rule

$$i_t = \bar{r} + E_t\ \pi_{t+1} + h\,(\pi_t - \pi^*) + w_t\,,$$

where w_t is a white-noise shock, $\pi_t = p_t - p_{t-1}$ and $h > 0$.

i) Determine the equilibrium path of y_t.

ii) Can the central bank by the above specified rule influence the volatility of output? (Calculate the variance of y_t and discuss!)

iii) Assume that $\sigma_s^2 = 0$. What would be the implication for the choice of h?

iv) Assume that $\sigma_u^2 = \sigma_v^2 = \sigma_w^2 = 0$. What would be the implication for the choice of h?

2. Assume that

$$h = 0$$

and that the central bank controls the money supply according to the rule

$$m_t = \bar{m} + z_t\,,$$

where z_t is a white-noise shock.

i) Determine the equilibrium path of prices.

ii) Determine the equilibrium path of output.

iii) Can a more precise control of m_t (reduced variance of z_t) reduce the volatility of prices?

iv) Can a more precise control of m_t reduce the volatility of output?

Part B.

3. Briefly explain what the "equity premium" is and why it is regarded as a "puzzle".

4. Consider an infinitely-lived person whose objective is to maximize:

$\sum_{t=0}^{\infty}\beta^t[(c_t)^{1-\rho}-1]/(1-\rho)$, where $0<\beta<1$ and $\rho>0$. The person has an initial endowment of y_0 units of the consumption good. His only way to transfer consumption from period to period is through a linear storage technology, whereby every unit stored at period t generates R (>0) units of the period t+1 consumption good. ,

   i) Write down the person's problem in form of a Bellman equation.

   ii) Show how the Bellman equation can be used in order to derive the Euler equations.

   iii) Use the Euler equation to test whether a saving rule whereby the person saves every period a fixed proportion, s, of his beginning-of-period resources is optimal. If it is, find the value of s in terms of the underlying parameters β, ρ and R. If it is not, explain why.

   iv) (For bonus points)
   How would your answer to part iii) change if the storage technology is given by $R\cdot S^{\alpha}$, $0<\alpha<1$?

5. Consider the dynamic system that relates Tobin's q to the firm's capital as presented in class. In particular, the firm faces adjustment costs to its capital stock of the form $\frac{\chi}{2}\frac{I^2}{K}$. Suppose the firm is in steady-state.

   i) Explain what the steady-state implications are for the firm's capital stock and for q.

   Assume now that the interest rate, r, has suddenly increased to a new constant level.

   ii) Show in the phase diagram what happens to the curve along which q is not changing and to the one along which K is not changing. Explain your drawing.

   iii) Show what happens to the q-K saddle-path, and explain your drawing.

   iv) What is the immediate impact of the increased r on q? What is the new steady-state? What happens along the adjustment path to q and K? Explain!

End of text. Good luck!