

Matr.-Nr. \_\_\_\_\_

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

**Examination:**

**Macroeconomic Analysis  
(No. 1428)**

**Semester:**

**Summer Semester 2004**

**Examiner:**

**Prof. Dr. Gerhard Schwödauer**

**The following aids may be used:**

**None.**

**Examination Questions:**

1. Consider an economy in which many, price-taking firms produce a homogeneous final output with a production function

$$Y = A [K^\gamma + (EN)^\gamma]^{1/\gamma}$$

with  $\gamma \leq 1, \gamma \neq 0$  and constant  $\dot{E}/E = g$ . The firms hire workers at a real wage rate  $w$  and are renting capital goods at a real rental rate  $r$ . A constant share  $s$  of GDP is saved and invested, the capital stock depreciates at a constant rate  $\delta$ . The labor force grows at a constant rate  $n$ . The factor prices  $w$  and  $r$  adjust continuously so that the capital stock and the labor force are always fully employed.

- a) Determine the steady-state capital-labor ratio  $K/EN$  for the following parameter values:  
 $A = 1, \gamma = -1, g = 0.02, n = 0.02, \delta = 0.06, s = 0.2$ .
  - b) Check whether in the steady-state equilibrium the “Golden Rule” is observed.
  - c) What can you say about the behaviour of the real wage rate  $w$  and the capital rental rate  $r$  at the steady state?
  - d) Assume that at some point of time there is an immigration wave which doubles the labor force. Discuss the impact, medium-run and long-run effects of this event on factor prices, the functional distribution of income, real GDP per capita and the level of real GDP as rigorously as possible (using the above specified parameter values).
2. Consider an economy with the same production arrangement as in problem 1 but with overlapping generations of optimizing consumers who live for two periods. In her first period the consumer is endowed with one unit of labor time. The consumer’s inter-temporal elasticity of substitution is 1, her subjective rate of time preference is  $\rho = 0.04$ .
- a) Set up the equation which describes the dynamics of  $K/EN$  and check whether for the parameter values given in problem 1 a positive steady-state capital-labor ratio exists.
  - b) Choose  $\gamma = 1/2$  (what does this mean in terms of elasticity of substitution?) and check whether a steady-state equilibrium with positive capital-labor ratio exists.
  - c) Give a quantitative estimate of the equilibrium  $K/EN$  for  $\gamma = 1/2$  and check whether the equilibrium is dynamically efficient.
  - d) What could the government do to reduce the extent of dynamic inefficiency? Name several options and analyse one of them quantitatively for the given parametrized model.