Original

Examination:	Economics III (Economic Policy) **Summersemester: 2001**
Examiner:	Dr. G. Groh
The following aids can be used:	Electronic calculator
Hint:	80 of the 100 points attainable are regarded as the maximum number one can reach in the time available.

Examination questions:

1. (20 points: (a): 4, (b): 9, (c): 7)

   (a) Assume the following behavioural functions for an economy:

$$\begin{aligned} C(t) &= c(1-\tau)Y(t), \quad && 0 < c < 1, \quad 0 < \tau(=\text{proportional income tax}) < 1 \\ I(t) &= \bar{I} + \alpha\sin(\pi t), \quad && \alpha > 0 \\ G(t) &= \bar{G} \end{aligned}$$

   - Determine on this basis the equilibrium output $Y(t)$ on the goods market.
   - Now determine the ratio between the upper amplitude and the average output. How does this ratio change, if τ is increased?

   (b) Now consider an economy without any income tax but with an automatic stabilizer of the following form:

$$G(t) = \bar{G} + \Delta G(t) \quad \text{with} \quad \Delta G(t) = \beta(\bar{Y} - Y(t)), \quad \beta > 0.$$

   (The term $\Delta G(t)$ might be interpreted as the difference between unemployment benefits and payments to the unemployment insurance). $\bar{Y}$ is the average output in time. Investment is again given by $I(t) = \bar{I} + \alpha\sin(\pi t)$ and consumption by $C(t) = cY(t)$ (due to $\tau = 0$ now). Determine again the equilibrium output on the goods market $Y(t)$ and give a graphical representation for the time paths of $Y(t)$ and $G(t)$. How does the path of $Y(t)$ depend on β?

   (c) Let now the following data be given: $\alpha = 90$; $c = 0.8$; $\bar{I} = 200$ and $\bar{G} = 100$. Which value of β is necessary, if the fluctuations of $Y(t)$ shall not exceed 20 % of $\bar{Y}$?

2. (20 points: (a): 7, (b): 6, (c): 7)

   (a) Give a brief description of the four building blocks of the monetarist model of the lecture.

   (b) Consider the resulting two-dimensional dynamical system in U and π:

$$\begin{aligned} \dot{U} &= -(1-\bar{U})(\mu - \pi) \\ \dot{\pi} &= \beta_w[(1-\bar{U})(\mu - \pi) - \beta_{\pi^e}(U - \bar{U})] \end{aligned}$$

   Derive on this basis the two zero-isoclines for U and π and give a graphical representation of them in the (U, π)-plane. Which directions of movement do result for U and π above and below these isoclines?

   (c) Assume now, that the economy is initially in the steady state of the system described in (b) and that the central bank raises the growth rate of money supply μ to a new level μ'. Show graphically, how the location of the isoclines (as well as of the new steady state) will change and give a brief (!) verbal description of the phases of the business cycle, which are necessarily passed during the adjustment process.

p.t.o.

3. (20 points: (a): 5, (b): 8, (c): 7)

   (a) Set up the formula for the evolution of the government's debt-to-GDP-ratio b_t in time (thereby relating it to b_{t-1}, R_{t-1}, n, d_t, H_t, H_{t-1} and p_tY_t). Now make the following simplifying assumptions: $R_t = \bar{R}$, $n = 0$, $\mu = 0$ for $t \geq 1$ and let b_1 be given. Derive on this basis the formula for b_4 in dependence on b_1, d_1, d_2, d_3 and $\bar{R}$.

   (b) Now assume, that for $t \geq 5$ the ratio of the primary deficit to GDP, d_t, will be constant and positive and that the central bank tries to stabilize b_t at the level reached in $t = 4$ by means of a constant positive growth rate of money supply (i.e. $H_t = (1+\mu)H_{t-1}$ for $t \geq 5$). Furthermore assume, that the Neo-quantity theory holds and that the velocity of money ($\bar{v}$) equals 1. Derive on this basis the formula for the resulting growth rate of money supply μ. (Hint: First use the last informations to transform the fraction $\frac{H_t - H_{t-1}}{p_tY_t}$ into an expression only containing μ. For the subsequent computations treat b_4 as a given magnitude).

   (c) How does the relationship between μ and π (for $t \geq 5$) look like in this case? Now describe in a few words, which general problem is highlighted by the above example. Under which designation is this problem known in economic literature?

4. (20 points: (a): 6, (b): 5, (c): 9)

   Assume a central bank wants to minimize the following loss function:

$$\mathcal{U}(U, \pi) = \frac{U^2}{2} + \theta\frac{\pi^2}{2}, \quad \theta = 4$$

   under the constraint given by the Phillips curve:

$$\pi = (-\beta_w)(U - \bar{U}) + \pi^e \quad \text{with} \quad \beta_w = 1 \quad \text{and} \quad \bar{U} = 5\% = 0.05.$$

   (a) Determine the short-run optimum with regard to U and π for $\pi^e = 0$.

   (b) Now compute the next short-run optimum, after the expected rate of inflation has adjusted to the actual rate of inflation determined in (a).

   (c) Determine the rate of inflation of the sustainable long-run equilibrium and give a (qualitative) graphical representation of your results obtained so far.

5. (20 points: (a): 5, (b): 6, (c): 9)

   (a) Consider the following concrete form of the Mundell-Fleming-model with fixed exchange rates:

$$C = 0.75(Y - \bar{T}), \quad \bar{T} = 100; \qquad CA \equiv X - eJ = 50 + 30 \cdot e - 0.2Y;$$
$$I = 295 - 500(r - \pi^e), \quad \pi^e = 0.01; \qquad Y = C + I + \bar{G} + X - eJ;$$
$$\bar{G} = 100; \qquad \frac{M}{p} = \frac{M^d}{p} = 0.2Y + 210 - 400r.$$

   Assume an exchange rate of $e = 5$ and that capital is not internationally mobile at all. Determine on this basis the equilibrium values for Y, r and $\frac{M}{p}$.

   (b) Consider again the Mundell-Fleming model with fixed exchange rates, but now with perfect international mobility of capital. Show graphically the consequences of a decline in government expenditures and give a short verbal explanation of the adjustment process.

   (c) Now assume flexible exchange rates and high but not perfect mobility of capital (BP-curve flatter than LM-curve). Describe (again graphically and verbally) the consequences of an increase in money supply.

Examination:	"Economics III" (Public Economics)
	Summersemester 2001
Examiner:	Prof. Claude Fluet
The following aids can be used:	Pocket calculator
Examinations questions:	

Short questions (10% each) – Answer briefly

1. Define Kaldor's compensation principle and explain Scitovsky's critique of that principle.

2. Explain the Condorcet voting paradox and give an example.

3. Suppose the cost of distributing electricity is of the form $C(q) = K + kq$, where q is the quantity distributed, K is the network fixed cost and k is marginal cost. What problems does such a cost function create?

4. What is the difference between the statutory and the economic incidence of a tax? Illustrate.

Problems (30% each)

1. The production cost of a public infrastructure is $C(x) = 3000x$, where x denotes the size of the infrastructure. There are two municipalities, labeled 1 and 2. For these communities, the marginal willingness to pay for the infrastructure (i.e., for "size") is respectively

$$\begin{aligned} p_1 &= 6000 - 5x \\ p_2 &= 4500 - 15x \end{aligned}$$

   (a) If the two communities are isolated, so that the infrastructure will not be shared between communities, what will be the size of infrastructure built in each community? Solve numerically and illustrate graphically-

   (b) Suppose now that the infrastructure can be shared. What should be its optimal size? Solve numerically and illustrate graphically.

   (c) Suppose community 1 cannot prevent people in community 2 from using the infrastucture in 1 and assume there is no coordination between municipalities. Show that community 1 will free-ride.

   (d) Discuss the following statement by a politician of community 1: "Since its people are using our own infrastructure, municipality 2 should be forced to contribute to its cost".

2. A two-firm one consumer economy is characterized by

$$\begin{aligned} y_1 &= f_1(L_1) = 2L_1 \\ y_2 &= f_2(L_2, y_2) = (6 - y_1)L_2 \\ u(y_1, y_2) &= y_1 y_2 \\ L_1 + L_2 &= 3 \end{aligned}$$

where L_i and y_i denote labor and output respectively. The wage rate is normalized to 1.

(a) What is the optimal allocation?

(b) Compute the perfectly competitive equilibrium and show that it does not lead to the optimal allocation.

(c) Show that that the optimum allocation can be achieved through markets if a unit tax t is imposed on good 1 with transfer z to the consumer from the proceeds of the tax.