Tentin päivämäärä / Date of exam:16.2.2016	Tentin kesto tunteina / Exam in hours:4
Tiedekunta / Faculty: OBS	
Opintojakson koodi, nimi ja tentin numero / The code and the name of the course and number of the exam: 721310S Economic Theory II. 3. tentti.	
Tentaattori(t) / Examiner(s): Prof. Mikko Puhakka	**Sisäinen postios. / Internal address : Taloustiede/OBS**
Sallitut apuvälineet / The devices allowed in the exam: ☒ Nelilaskin / Standard calculator x Funktiolaskin / Scientific calculator ☐ Ohjelmoitava laskin / Programmable calculator ☐ Muu materiaali, tarkennettu alla / Other material, specified below:	
Tenttiin vastaaminen / Please answer the questions: ☒ Suomeksi / in Finnish ☒ Englanniksi / in English	
Kysymyspaperi on palautettava / Paper with exam questions must be returned: ☒ Kyllä / Yes ☐ Ei / No	

University of Oulu
Economics
Fall 2015
Professor Mikko Puhakka
Econ Theory II, Exam February 16, 2016.

Answer all the questions. You can answer in Finnish. The weight of each question is the same. Good Luck!

1. (6p) Consider the following ISLM model:

(a) $\frac{M}{P} = \underset{- \ +}{L(r,Y)}$

(b) $Y = \underset{+ \ - \ + \ -}{E(Y,r,G,T,)}$ and with the assumption $0 < E_Y < 1$.

Equation (a) is the LM curve, where r is the real rate of interest. Equation (b) is the IS curve, where on the left-hand side there is the aggregate output (income) and on the right-hand side total expenditures (consumption, investment, and government expenditures (G)). In the brackets below, the signs of the partial derivatives are shown (the signs of their effect on expenditures (E) and demand for money (L)). Lump-sum taxes are denoted by T. The endogenous variables of the model are aggregate output (Y) and the real rate of interest (r).

(i) What conditions do you need to make sure that the endogenous variables are functions of the exogenous variables?

(ii) What is the effect of a change in taxes (T) on the model's equilibrium with the assumption that public expenditures do not change?

2. (6p) Let the two period lived consumer's lifetime utility function be: $v(c_1,c_2)=\ln c_1+\beta c_2$, where $1>\beta>0$. The lifetime budget constraint is: $c_1+\frac{c_2}{R}\le y_1+\frac{y_2}{R}$. y_1 (y_2) are positive endowments (or incomes) and R is the interest factor. Solve his saving function.

3. (6p) Explain the contents of the Ricardian Equivalence theorem.

4. (6p) Let the aggregate production function be Cobb-Douglas: $Y=AK^{\alpha}L^{1-\alpha}, 0<\alpha<1$, and with $A>0$. Denote the positive marginal propensity to save by s and the growth rate of population (the number of employed people) by n. There is no depreciation and no technical progress. What is the growth rate of output per capita on the balanced (steady state) growth path? Explain your reasoning!

5. (6p) Explain the contents of the Phelps-Koopmans inefficiency theorem.

6. (6p) Consider the following problem: maximize $\sum_{t=0}^{\infty}\beta^t \ln c_t$ subject to $c_t+k_{t+1}=Ak_t^{\alpha}$. $0<\beta<1$, $0<\alpha<1$ and $A>0$. Solve the problem with dynamic programming as far as you can. In particular, answer the following questions:

(i) Write down the Bellman equation.
(ii) Characterize the steady state.
(iii) Sketch the dynamics as far as you can.

(Hint: there is the Euler condition somewhere!!!)

7. (6p) Let the objective function (to be maximized) for the policy authority to be $M(y,\pi)=-\frac{1}{2}\left[(y-k\bar{y})^2+a\pi^2\right]$ ja $k>1$.

a is the weight given to inflation in the objective function. y ($\bar{y}$) is the aggregate output (potential output) and π the rate of inflation. The private sector's behavior is described by the following Phillips curve: $y=\bar{y}+\gamma(\pi-\pi^e), \gamma>0$. π^e is the expected inflation. Solve the time consistent equilibrium. Pay attention to the concepts, you use.

8. (6p) Consider the following macro model, where the variables are in logarithms:

(1) $m=p+y$

(2) $p=p^e+a(y-y^*)$, $a>0$

(3) $m=\overline{m}+\omega$.

Equation (1) is the demand function for money, (2) is the Phillips curve and (3) the monetary policy rule. y^* is the potential output. ω is a shock to monetary policy. Its mean is zero and the variance is finite. $\overline{m}$ is some constant. p^e is the expected price level. Solve the rational expectations

equilibrium of the model, i.e. solve the level of aggregate output (y) and price level (p) in that equilibrium. What is p^e, when the economic agents (taloudenpitäjät) have rational expectations?

Return the question sheet!!!

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