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Stockholms universitet

Department of Economics

Exam

Course name:	Intermediate Macroeconomics
Course code:	EC2201
Examiner:	Paul Klein
Number of credits:	7.5
Date of exam:	December 3 , 2016
Time of exam:	9:00-14:00

Instructions

Please write your student identification number on each paper and cover sheet.

Read each question carefully. Use only one cover sheet per question. If you introduce notation not used in the question, please provide definitions. If you find a question ambiguous, please specify your interpretation. Please write legibly. Scientific (but not programmable) calculators are allowed. All questions must be answered in English except the essay question, which may be answered in English, Swedish, Norwegian or Danish.

The exam consists of four parts as follows. I. Multiple choice. II. Short answers. III. Mathematical problems. IV. Essay. Each part may offer a choice of which question or questions to answer. Each part accounts for a quarter of your total grade. The maximum total score is 100.

For the grade E, 45 points are required; for D, 50; for C, 60; for B, 75; and for A, 90 points.

If you have submitted acceptable answers to four out of five assignments, please solve one of the mathematical problems in part III. Otherwise, solve two.

Your results will be available on December 6 at the latest.

Good luck!

Part I. Multiple choice questions.

Instructions

For each question, please indicate the best alternative. Each correct answer yields 3 points. Full marks yields a bonus point. The maximum total score for this part is 25.

1. The Solow model implies that...

   (a) consumption per person converges to a constant.
   (b) the marginal product of labour converges to a constant.
   (c) the capital/output ratio converges to a constant.
   (d) output converges to a constant.

2. According to the Solow model,

   (a) a country's investment/GDP ratio has no permanent effect on the growth rate.
   (b) a change in a country's investment/GDP ratio has no effect on the growth rate, even in the short run.
   (c) a country's investment/GDP ratio has no permanent effect on GDP per capita.
   (d) a country's investment/GDP ratio has no effect on GDP per capita, even in the short run.

3. According to standard economic theory, higher taxes lead to lower market labour supply if the increase in revenue is used to...

   (a) increase defence spending.
   (b) increase the family caregiver amount (FCA)[1] (*vårdbidrag*[2]).
   (c) increase subsidies on public transport.
   (d) increase state support for political parties.

[1] If you have a dependant with an impairment in physical or mental functions, you may be eligible to claim an amount on line 367 of your Federal Tax Form.

[2] En förälder som har extra arbete eller kostnader för ett barn som är sjukt eller har en funktionsnedsättning kan få vårdbidrag.

4. When you see a country running a large current account surplus you conclude that this country...

   (a) probably has a generous public pension system.
   (b) probably has a lot of young and old people as a fraction of their population.
   (c) is probably doing well economically.
   (d) may soon run out of a lucrative natural resource.

5. Which aphorism comes closest to capturing the truth about how a country best achieves prosperity?

   (a) "A better burden may no man bear than much wisdom and good sense." [*"På vägen ej bärs en bättre börda än mycken visdom och vett."*] (Hávamál)
   (b) "We must not only cease our present desire for the growth of the state, but we must desire its decrease, its weakening." (Leo Tolstoy)
   (c) "The borrower is slave to the lender." (Proverbs 22:7, New International version)
   (d) "No civilization... would ever have been possible without a framework of stability... Foremost among the stabilizing factors... are the legal systems that regulate our life in the world and our daily affairs with each other." (Hannah Arendt)

6. According to the Christiano-Eichenbaum model of real business cycles, a greater than expected level of government purchases leads to an increase in hours worked and output because...

   (a) people realize that they are poorer than they previously thought.
   (b) it is not expected to last forever.
   (c) public spending stimulates the economy through the multiplier effect.
   (d) public investment boosts business confidence.

7. The purchasing power parity (PPP) theory of exchange rates accounts for a large fraction of exchange rate changes for a pair of countries that...

   (a) are in a common market such as Sweden and Denmark.
   (b) have very different rates of inflation such as Canada and Argentina.
   (c) have similar levels of GDP per capita, such as Norway and Singapore.
   (d) have very different levels of GDP per capita, such as Australia and Kiribati.

8. In the basic Mortensen-Pissarides model, the reason unemployment increases if unemployment benefits are raised is that...

   (a) the unemployed have weaker incentives to search for a job.
   (b) wages rise and hence fewer vacancies are posted.
   (c) taxes must rise to pay for the increase in benefits.
   (d) the Beveridge curve shifts to the left.

Part II. Short answer questions.

Instructions

This part contains five questions. Please choose three of them and answer only those. Each answer should cover no more than half a page. Each answer carries a maximum score of 8, though a particularly good answer may score a bonus point. The maximum total score for this part is 25.

1. "Frictional and structural unemployment are really the same thing; they are both about mismatch." Discuss.

2. "Human capital is the most important factor determining differences in real output per capita across countries." Discuss.

3. "Taxes kill jobs." Discuss.

4. "The labour supply curve slopes down if and only if leisure is a Giffen good." Discuss.

5. "Exchange rates fluctuate more than the underlying fundamentals because investors have a nervous tendency." Discuss.

Part III. Mathematical problems.

Instructions

This part contains three questions. Please choose two of them (if you have not submitted acceptable assignment answers) or just one (if you have). This part carries a maximum score of 25 points. If you handed in acceptable answers to the assignments, you have automatically gained 13 points already.

1. Consider Solow's growth model in continuous time where output $Y(t)$ is produced according to

$$Y(t) = K^{\alpha}(t)L^{1-\alpha}(t)$$

where labour input is the product of the level of technology $A(t)$ and the population size $N(t)$ so that

$$L(t) = A(t)N(t).$$

We assume that the population $N(t) = N$ is constant over time, that technology $A(t)$ grows at a proportional rate of $\gamma_A = 0.02$ and that the depreciation rate is $\delta = 0.06$. Capital's share of income α is $1/3$. The investment rate s is 0.20.

   (a) Derive an expression for the long-run capital/output ratio and find its numerical value in this case.

   (b) What is the long-run growth rate of output?

   (c) The economy is on a balanced growth path before a given instant t_0. Suddenly, at that instant, the investment/GDP ratio s jumps to 0.24 and stays there forever.

      (i) Find the new long-run capital/output ratio.

      (ii) Has the long-run growth rate of output changed? If so, what is the new long-run rate of growth?

      (iii) Find the (instantaneous) growth rate of output at $t = t_0$.[3]

[3] If you are worried about mathematical subtleties, consider the growth rate at $t = t_0 + \varepsilon$ and let $\varepsilon \downarrow 0$.

2. Suppose a country exists for two periods, $t = 1$ and $t = 2$. It produces y_1 units of output in period 1. It can either spend it on consumption (denoted by c_1), investment at home (denoted by k), or investment abroad (denoted by b) or a combination of all these. There are diminishing returns to investing at home, but a constant rate of return $r \geq 0$ on investing abroad. Mathematically, the country faces the following constraints:

$$\begin{cases} c_1 + k + b &= y_1 \\ c_2 &= y_2 + (1+r)b \\ y_2 &= f(k) \end{cases}$$

where $f(k) = \alpha + \beta k - \frac{1}{2}k^2$. Preferences are such that consumers choose $c_1 = c_2$ no matter what.

(a) Derive a single–equation intertemporal budget constraint for this economy.

(b) Write down the optimal domestic investment problem and characterize its solution. Be as specific as you can.

(c) Suppose $y_1 = 1$, $r = 1$, $\alpha = 1$ and $\beta = 2$. Show that the trade balance in period 1 is zero.

(d) Suppose $y_1 = 2$, $r = 1$, $\alpha = 1$ and $\beta = 2$. Show that there is a trade surplus in period 1. Explain why.

(e) Suppose $y_1 = 1$, $r = 0$, $\alpha = 1$ and $\beta = 2$. Show that there is a trade deficit in period 1. Explain why.

3. Consider a model of frictional unemployment where time is continuous and the labour force $N = 1$ is fixed and normalized to unity. The meeting (matching) rate per unit of time is given by the following function:

$$m(u, v) = 2 \cdot \sqrt{u \cdot v}$$

where u is the number (fraction) of unemployed, and v is the number of vacancies. Meanwhile, the separation rate (the rate at which employer/worker pairs are broken up) is denoted by λ.

(a) Write down an expression for $\dot{u}(t)$, the time derivative of the unemployment rate $u(t)$.

(b) Derive a relationship between u and v that must hold in a steady state (derive a steady state Beveridge curve).

(c) Suppose $\lambda = 0.25$.

(i) How many vacancies v must there be in order for steady state unemployment to be 20 percent?

(ii) How many vacancies v must there be in order for steady state unemployment to be 4 percent?

Part IV. Essay questions.

Instructions

This part contains three questions. Please answer just one of them. Your answer should not exceed one page. This part carries a maximum score of 25 points.

1. "The main cause of the business cycle, and a sufficient cause, seems to be the fact that technical and commercial progress ... sometimes speeds up and sometimes slows down." (Knut Wicksell)

   Do you agree?

2. "The current account position often gives a good reading of economic health." (Roger Bootle)

   Do you agree?

3. What policies might be used to increase the employment rate?

FORMULA SHEET

- $x^\alpha \cdot x^\beta = x^{\alpha+\beta}$; $(x^\alpha)^\beta = x^{(\alpha\beta)}$; $x^\alpha y^\alpha = (xy)^\alpha$.
- If $h(x) \equiv f(g(x))$ then $h'(x) = f'(g(x))g'(x)$.
- If $h(x) \equiv f(x)g(x)$ then $h'(x) = f'(x)g(x) + f(x)g'(x)$.
- If $h(x) \equiv f(x)/g(x)$ then $h'(x) = [f'(x)g(x) - f(x)g'(x)]/g^2(x)$.
- If $y = x/(1-x)$ then $x = y/(1+y)$.
- The Slutsky equation when income m is fixed:

$$\frac{\partial x_i}{\partial p_i} = \frac{\partial h_i}{\partial p_i} - \frac{\partial x_i}{\partial m} \cdot x_i.$$

- The Slutsky equation when $m = \mathbf{p} \cdot \boldsymbol{\omega}$:

$$\frac{\partial x_i}{\partial p_i} = \frac{\partial h_i}{\partial p_i} + \frac{\partial x_i}{\partial m} \cdot (\omega_i - x_i).$$

- The Cobb-Douglas (Wicksell) production (or utility) function:

$$f(\mathbf{x}) = x_1^{\alpha_1} x_2^{\alpha_2} \dots x_n^{1-\alpha_1-\alpha_2-\dots-\alpha_{n-1}}.$$

- If $Z(t) \equiv X(t) \cdot Y(t)$ then

$$\frac{\dot{Z}(t)}{Z(t)} = \frac{\dot{X}(t)}{X(t)} + \frac{\dot{Y}(t)}{Y(t)}.$$

- If $Z(t) \equiv X(t)/Y(t)$ then

$$\frac{\dot{Z}(t)}{Z(t)} = \frac{\dot{X}(t)}{X(t)} - \frac{\dot{Y}(t)}{Y(t)}.$$

- More generally, if $Z(t) \equiv X^\alpha(t)Y^\beta(t)$ then

$$\frac{\dot{Z}(t)}{Z(t)} = \alpha\frac{\dot{X}(t)}{X(t)} + \beta\frac{\dot{Y}(t)}{Y(t)}.$$