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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:	October 23, 2017
Time of exam:	9:00-14:00

Instructions

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

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 November 6 at the latest. The exam review will be held on November 21, 16:00-18:00.

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

   (a) invest in infrastructure.
   (b) increase subsidies on dental care.
   (c) fund research on cosmology.
   (d) build statues of dead kings.

2. According to Solow's growth model,

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

3. According to Lucas' "monetary misperceptions" model, an increase in the money supply increases output because...

   (a) people suffer from money illusion—they think that any change in a nominal price of a good is a change in the relative price of that good.
   (b) people are not fully informed, so they mistake an increase in a nominal price for an increase in the corresponding relative price.
   (c) people are not fully rational and follow rules of thumb.
   (d) people are easily manipulated.

4. In the Christiano-Eichenbaum real business cycle model, a shock to government consumption has a bigger effect on labour supply...

   (a) the longer it is expected to last.
   (b) the less time it is expected to last.
   (c) the greater the extent to which consumption and leisure are substitutes.
   (d) the more patient people are.

5. If Ricardian equivalence holds, the current account will deteriorate in response to...

   (a) a tax cut.
   (b) a temporary increase in government purchases.
   (c) a tax increase.
   (d) a permanent increase in government purchases.

6. If technology shocks were the only driving force behind the business cycle, the correlation between hours worked and output per hour would be...

   (a) close to +1.
   (b) close to -1.
   (c) close to 0.
   (d) about $+1/2$.

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

   (a) is probably manipulating the value of its currency.
   (b) might recently have discovered that it is abundant in natural resources.
   (c) is growing fast.
   (d) may have a lot of middle-aged people.

8. In the Mortensen-Pissarides model, raising unemployment benefits is likely to increase unemployment because...

   (a) the unemployed have weaker incentives to search for a job.
   (b) workers enjoy more bargaining power.
   (c) the Beveridge curve shifts to the right.
   (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. "The Solow model has interesting implications for levels of GDP, but not about growth." Discuss.

2. "The labour supply curve slopes up if consumption and leisure are good enough substitutes." Discuss.

3. "Standard economic theory suggests that government deficits are likely to be associated with current account deficits." Discuss.

4. "Exchange rates fluctuate more than the underlying fundamentals. Hence markets are not efficient." Discuss.

5. "The Mortensen-Pissarides model predicts a stable relationship between vacancies and unemployment." Discuss.

Part III. Mathematical problems.

Instructions

This part contains three questions. Please choose one of them (if you have received passing grades on at least four of your assignments) or two (if you have not). If you answer more questions than required, you will be graded on the basis of those answers that come first. This part carries a maximum score of 25 points.

1. Consider a version of Dornbusch's "overshooting" model of exchange rates, according to which

$$\begin{aligned} m - p(t) &= -\frac{1}{2} i(t) && (1) \\ i(t) &= i^* + \dot{e}(t) && (2) \\ \dot{p}(t) &= e(t) - p(t) && (3) \\ p(t_0) &= p_0. && (4) \end{aligned}$$

where $p(t)$ is the log price level, $e(t)$ is the log exchange rate, $i(t)$ is the (domestic) nominal interest rate, i^* is the foreign nominal interest rate and m is the log money supply. The initial log price level p_0 is exogenously given. Every solution to the above system of differential equations can be written as

$$\begin{aligned} e(t) &= i^*/2 + m + k_1 \cdot \exp\{-2(t - t_0)\} + 2 \cdot k_2 \cdot \exp\{t - t_0\} && (5) \\ p(t) &= i^*/2 + m - k_1 \cdot \exp\{-2(t - t_0)\} + k_2 \cdot \exp\{t - t_0\} && (6) \\ i(t) &= i^* - 2 \cdot k_1 \cdot \exp\{-2(t - t_0)\} + 2 \cdot k_2 \cdot \exp\{t - t_0\}. && (7) \end{aligned}$$

for some constants k_1 and k_2.

   (a) Explain the economics behind Equation (2).

   (b) Explain why convergence to the steady state (as $t \to \infty$) implies $k_2 = 0$.

   (c) Suppose $m = 1$, $i^* = 0$.

      (i) Determine the steady state values of $e(t)$ and $p(t)$.

      (ii) Suppose $p_0 = 0$. Determine k_1 and hence determine $e(t_0)$.

      (iii) Notice that $e(t_0)$ exceeds the steady state (long-run) value of $e(t)$. Explain the economic logic behind this "overshooting" phenomenon.

   Note: By $\exp\{x\}$ I mean the exponential function, which is often, though not always, denoted by e^x. In this case I don't want to use the latter notation, because e stands for the (log) exchange rate.

2. Suppose a country exists for two periods. It produces y_1 units of output in period 1 and y_2 units in period 2. Meanwhile, it consumes c_1 in period 1 and c_2 in period 2. It has access to a world capital market where it can borrow or lend at interest rate r, meaning that

$$c_1 = y_1 + b$$

and

$$c_2 = y_2 - (1 + r)b.$$

The production possibility frontier is linear so that

$$\alpha y_1 + y_2 \leq \alpha$$

and we also require that $y_1 \geq 0$ and $y_2 \geq 0$. Suppose preferences are Leontieff; specifically, they are represented by the following utility function.

$$u(c_1, c_2) = \min\{c_1, c_2\}.$$

(a) Draw the production possibility frontier and discuss how it shifts as you change α.

(b) Write down a one-equation intertemporal budget constraint.

(c) Suppose $\alpha = 2$, $r = 0$. Find the period 1 trade balance.

(d) Suppose $\alpha = 1/2$, $r = 0$. Find the period 1 trade balance, and explain why it's different from what you found in (c).

(e) Suppose $\alpha = 2$, $r = 2$. Find the period 1 trade balance, and explain why it's different from what you found in (c).

3. Consider the imaginary data in Table 1.

Table 1: **Imaginary Data**

	Real GDP/capita in CAD (2000)		
Year	Acadia	Bergonia	Cascadia
1920	10000	12599	14422
1921	10523	12959	14692
1940	19594	20444	21123
1960	30693	31009	31268
1980	46197	46317	46417
1999	67515	67564	67604
2000	68871	68917	68955

(a) Do you see any evidence of convergence towards a common balanced growth path?

(b) Explain why a Solow model is more appropriate in accounting for these data than an AK (Rebelo) model.

(c) What, roughly, will output per capita be in each country in 2020?

(d) The ratio of investment to output in each country has always been 0.20 and the depreciation rate 8 percent per year. Also, the population was constant over time in each country.

(i) What, roughly, was the capital/output ratio in each country in 2000?

(ii) In 1920, the capital/output ratio in Acadia was 1.00, in Bergonia 1.59 and in Cascadia it was 2.08. Can you infer what the capital share (or capital elasticity of output) was (and presumably still is) in each country? Explain your reasoning.
Hint: don't worry if you don't get a nice fraction. But don't worry if you do, either.

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. "Output per capita differences across countries are mainly due to differences in total factor productivity." Do you agree?
2. "Any empirically plausible business cycle theory must feature sizeable shocks both to labour supply and to labour demand." Do you agree?
3. "Government deficits stimulate the economy." Do you agree?

FORMELSAMLING

- $x^\alpha \cdot x^\beta = x^{\alpha+\beta}$; $(x^\alpha)^\beta = x^{(\alpha\beta)}$; $x^\alpha y^\alpha = (xy)^\alpha$.
- 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 $m = \mathbf{p} \cdot \boldsymbol{\omega}$:

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

- 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

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