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Stockholms universitet

Department of Economics

Retake Exam

Course name:	Intermediate Macroeconomics
Course code:	EC2201
Examiner:	Paul Klein
Number of credits:	7.5
Date of exam:	December 9, 2018
Time of exam:	9:00-14:00

Instructions

Write your identification number on each answer sheet (the number found in the upper right hand corner on your exam cover).

Start each new question on a new answer sheet. 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 made available on your Ladok account (`www.student.ladok.se`) no later than 15 working days from the date of the examination.

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 wages lead to higher labour supply if...

   (a) leisure is a normal good.
   (b) leisure is an inferior good.
   (c) leisure and consumption are good enough substitutes.
   (d) leisure and consumption are perfect complements.

2. In Solow's growth model,

   (a) the long-run capital/output ratio does not depend on the capital share.
   (b) the long-run capital/labour ratio does not depend on the capital share.
   (c) the long-run capital/output ratio does not depend on the depreciation rate.
   (d) the long-run capital/labour ratio does not depend on the depreciation rate.

3. In the Christiano-Eichenbaum version of the "real business cycle" model, labour supply responds more to a given government consumption shock when...

   (a) the shocks are more persistent.
   (b) the shocks are less persistent.
   (c) the shocks are more volatile.
   (d) the shocks are less volatile.

4. The Beveridge curve is...

   (a) the relationship between unemployment and output.
   (b) the relationship between unemployment and wages.
   (c) the relationship between unemployment and vacancies.
   (d) the relationship between unemployment and inflation.

5. Ricardian equivalence will not hold if...

   (a) people live forever.
   (b) taxes are distortionary.
   (c) labour supply is completely inelastic.
   (d) the capital market is efficient.

6. If shocks to technology 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 an attractive place to invest.
   (b) may expect to run out of its stock of natural resources soon.
   (c) is highly competitive.
   (d) may have a high fertility rate.

8. In Dornbusch's model of exchange rates, nominal exchange rates fluctuate more than the money supply if...

   (a) money supply shocks are very persistent and consumer prices are fully flexible.
   (b) money supply shocks are purely temporary and consumer prices are fully flexible.
   (c) money supply shocks are purely temporary and consumer prices are very sticky.
   (d) money supply shocks are very persistent and consumer prices are very sticky.

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 is well-designed to fit the experience of West Germany 1946-1990, but not South Korea 1953-2014." Discuss.

2. "Germany's trade surplus is a result of the superior German manufacturing sector." Discuss.

3. "PPP is a terrible theory of exchange rates." Discuss.

4. "Europeans work less than North Americans because they face higher tax rates." Discuss.

5. "Theory and data agree that the best way to reduce unemployment is to incentivize the unemployed by cutting their benefits." 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 Solow's growth model in continuous time where output is produced according to

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

where labour input is equal to population so that

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

We assume that population $N(t)$ grows at the rate 0.005 and that the depreciation rate is $\delta = 0.075$. Capital's share of income α is 0.4. The investment rate s is 0.24.

(a) Suppose you are given the capital/labour ratio k. What is then the capital/output ratio (in terms of k)?

(b) What is the long-run capital/output ratio in this model (your answer should be a number)?

(c) Consider an instant $t = t_0$ such that the capital/output ratio is 2.4.

(i) Is the economy below or above its balanced growth path at $t = t_0$?

(ii) Suppose the capital share α is (and always has been) 0.25? What would the growth rate of output at $t = t_0$ be then?

2. Consider a discrete-time version of Dornbusch's "overshooting" model of exchange rates, according to which

$$\begin{aligned} m - p_t &= -i_t && (1) \\ i_t &= 12 \cdot (e_{t+1} - e_t) && (2) \\ p_{t+1} - p_t &= \frac{1}{9} \cdot (e_t - p_t). && (3) \end{aligned}$$

where p_t is the log price level, e_t is the log exchange rate, i_t is the (domestic) nominal annualized interest rate. We assume that i^*, the foreign nominal annualized interest rate, is zero. Meanwhile, m is the log money supply. The initial ($t = 0$) log price level p_0 is exogenously given. Each time period corresponds to one month.

(a) Find the steady state values of p and e as a function of m.

(b) It turns out that the only solution that converges to the steady state satisfies

$$p_{t+1} = \frac{5}{6} \cdot p_t + \frac{1}{6} \cdot m.$$

Using this information, derive an expression for e_t in terms of p_t and m.

(c) Suppose m was equal to 0 for $t = -\infty, \ldots, -3, -2, -1$ but at $t = 0$ it suddenly and unexpectedly jumps to 1 and stays there, and is expected to stay there, forever.

(i) What is a reasonable value for p_0?

(ii) What do you think e_{-1} was?

(iii) What is e_0? What is e_1? Verify and explain the "overshooting" property of exchange rates in this model.

3. Consider a version of Rogoff's model of monetary policy making. Suppose that

$$y_t = \pi_t - \pi_t^e + \varepsilon_t \tag{4}$$

where y_t is log output in period t, π_t is the inflation rate and ε_t is a random variable with mean zero and variance σ_ε^2, representing a supply shock.

The monetary policy maker minimizes

$$(y_t - \overline{y})^2 + \pi_t^2.$$

At the beginning of each period, inflationary expectations π_t^e are determined without the benefit of knowing the realization of ε_t. After that, ε_t is realized and the policy maker sets inflation π_t based on knowledge of that realization.

(a) Find the equilibrium values of π_t and y_t as a function of ε_t and $\overline{y}$.

(b) Find the mean of log output and of inflation as a function of $\overline{y}$.

(c) Find the variance of log output and of inflation as a function of σ_ε^2.

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. "A large current account deficit is a cause for concern." Do you agree?
2. "Under reasonable assumptions, labour supply curves slope up." Do you agree?
3. "The main, and in itself sufficient, cause of business cycle fluctuations ... is the fact that technical and commercial progress ... sometimes speeds up and sometimes slows down." (Knut Wicksell) 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

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