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Exam

Course name: Intermediate Macroeconomics
Course code: EC2201
Examiner: Paul Klein
Number of credits: 7.5
Date of exam: October 29, 2018
Time of exam: 9:00-14:00

Instructions

Please write your 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 12 at the latest. The exam review will be held on November 28, 10.00-12.00 in Hörsal 10.

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) people have enough unearned income.
 - (c) leisure is a luxury good.
 - (d) leisure and consumption are poor substitutes.

2. In Solow's growth model,
 - (a) the depreciation rate has no effect on the level of GDP per head.
 - (b) convergence to the balanced growth path is faster the higher the depreciation rate is.
 - (c) convergence to the balanced growth path is slower the higher the depreciation rate is.
 - (d) a change in the depreciation rate has no effect on the growth rate of output, even in the short run.

3. In the Kydland-Prescott "real business cycle" model, labour supply responds more to a given productivity 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 Mortensen-Pissarides model of frictional unemployment predicts a Beveridge curve that...
- (a) is stable over time.
 - (b) shifts to the left when unemployment is rising.
 - (c) shifts to the left when unemployment is falling.
 - (d) is vertical.
5. Ricardian equivalence will not hold if...
- (a) taxes are distortionary.
 - (b) there are births and deaths.
 - (c) some people are borrowing constrained.
 - (d) any of the above is true.
6. If shocks to preferences 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 deficit you conclude that this country...
- (a) is an attractive place to invest.
 - (b) expects to run out of its stock of natural resources soon.
 - (c) is in need of structural reform.
 - (d) may have a lot of middle-aged people.
8. In Dornbusch's model of exchange rates, exchange rates fluctuate more than the money supply does because...
- (a) domestic prices are sticky.
 - (b) purchasing power parity must hold at all times.
 - (c) investors prefer money over bonds.
 - (d) expectations are not fully rational.

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 useful for understanding growth in the short run, but not for understanding long-run growth.” Discuss.
2. “The Kydland-Prescott model is not believable because technology cannot, by definition, regress; it can only progress.” Discuss.
3. “Because Ricardian equivalence is unlikely to hold, there is a case for using government deficits to stimulate the economy.” Discuss.
4. “High income taxes lead to low labour supply.” Discuss.
5. “The Mortensen-Pissarides model is useful for understanding frictional but not structural 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. Suppose a country exists for two periods. Its present and future production possibilities are described via

$$ay_1 + y_2 \leq 3$$

and $y_1 \geq 0$, $y_2 \geq 0$ where y_1 and y_2 denote output in periods 1 and 2, respectively. Meanwhile, residents maximize

$$u(c_1, c_2) = \ln c_1 + \frac{1}{2} \ln c_2$$

where c_1 and c_2 denote consumption in periods 1 and 2, respectively. There is a world capital market where residents can borrow and lend freely at an interest rate $r = 1$, meaning that if you invest €1 in period 1, you get €2 in period 2.

- (a) Write down an intertemporal budget constraint for this economy.
- (b) Suppose $a = 1$. Compute the current account balance in periods 1 and 2. Explain why it is positive in period 1.
- (c) Suppose $a = 3$. Compute the current account balance in periods 1 and 2. Explain why it is negative in period 1.

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

$$m - p_t = -0.5 \cdot i_t \quad (1)$$

$$i_t = 12 \cdot (e_{t+1} - e_t) \quad (2)$$

$$p_{t+1} - p_t = 0.15 \cdot (e_t - p_t). \quad (3)$$

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.

- Explain the economics behind Equation (2). In particular, explain the presence of the number 12.
- Explain the economics behind Equation (3). (You do not need to explain the number 0.15.)
- Find the steady state values of p and e as a function of m .
- It turns out that the only solution that converges to the steady state can be represented as

$$p_{t+1} = \frac{3}{4} \cdot p_t + \frac{1}{4} \cdot m,$$

$$e_t = -\frac{2}{3} \cdot p_t + \frac{5}{3} \cdot m$$

and

$$i_t = 2 \cdot p_t - 2 \cdot m.$$

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

- What is a reasonable value for p_0 ?
- What do you think e_{-1} was?
- What is e_0 ? What is e_1 ?
- What happens to e_t as $t \rightarrow \infty$?

3. Consider an economy where every consumer i maximizes

$$\alpha \ln c_i + (1 - \alpha) \ln(1 - h_i)$$

where c_i is consumption and h_i is the fraction of available time spent in paid employment. Suppose there is a labour income tax τ and a transfer payment T so that every consumer's budget constraint is

$$c_i = (1 - \tau)wh_i + T.$$

where w is the (real) wage. We assume that w is fixed throughout this question. The parameter α satisfies $0 < \alpha < 1$. Define H as the average value of h_i over all the i s.

(a) Explain why

$$\tau w H = T$$

should hold in equilibrium.

(b) Solve for the equilibrium value of H in terms of τ and α .

(c) Verify that H is independent of w but decreases as a function of τ . Explain why.

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. “Once a country has a big enough debt/GDP ratio, it is stuck in a trap, because austerity depresses growth.” Do you agree?
2. “The main cause of differences in output per head across countries is differences in human capital.” Do you agree?
3. “Ricardian equivalence is a useless concept because it is so unlikely to hold in the real world.” 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

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