Queen Mary
University of London

May Examination Period 2024

ECN346 Business Cycles Duration: 2 hours

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Answer FOUR questions. ONE question from each SECTION

If you answer more questions than specified, only the first answers (up to the specified number) will be marked. Cross out any answers that you do not wish to be marked

You are permitted to bring 20 x A4 pages of notes into your examination (i.e. 10 double sided pieces of paper). These can be typed or handwritten and can include graphs and images. They can include material from any source.

Your notes must be stapled together and include your student ID number and the module code on the first page. You must submit your notes at the end of the examination with your answer booklet.

Calculators are not permitted in this examination. Complete all rough workings in the answer book and cross through any work that is not to be assessed.

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Examiners: Dr Roman Sustek

Section A

Question 1

Why is it necessary to take logs of some macroeconomic time series?

[20 marks]

Question 2

What is fiat money and why is it valued?

[20 marks]

Section B

Question 3

Suppose that rents D are always a constant fraction θ of people's income Y. Suppose that income is constant over time. Suppose also that buy-to-let investors discount future rents (from now until the infinite future) at a constant net interest rate r. Derive the price-to-income ratio.

[25 marks]

Question 4

In the data the share of housing expenditures in people's income is approximately constant in the long run. What does this tell you about the utility function in housing and consumption that people have? Try to support your answer with a mathematical derivation.

[25 marks]

Section C

Question 5

Consider the following two-period lives OLG model with capital and constant population. Normalize the number of young in a given cohort to one. Preferences of future generations over consumption are $\log c_{1t} + \beta \log c_{2,t+1}$, where $\beta > 0$. When young, the agents supply one unit of labour at a wage rate w_t. When old, the agents are unable to supply labour. The only asset available for saving is capital k_{t+1}, which is rented to firms in old age at a net rental rate r_{t+1}. A fraction δ of capital depreciates when rented out to firms. Capital and labour are used by firms, of which there is a measure one, to produce a single good according to a production function $Y_t = A_t K_t^{\alpha} N_t^{1-\alpha}$, where A_t is an exogenous stochastic level of TFP, N_t is labour, K_t is capital, and $\alpha \in (0, 1)$. Firms maximise their profits. Markets are competitive (all agents are price takers). TFP follows an AR(1)process $A_t = \exp z_t$, where $z_t = \rho z_{t-1} + \varepsilon_t$, with $\epsilon_t \sim N(0, \sigma^2)$. Explain how you would calibrate the parameters β, α, δ, ρ and σ and derive any equilibrium conditions necessary for the calibration.

[30 marks]

Question 6

Consider an economy in which people live for two periods. The economy lives forever. Normalize the number of young in a given cohort to one. When young, people supply one unit of time to perfectly competitive firms, of which there is a measure one, at the wage rate w_t. When old, people do not have any productive time endowment. There is a fixed stock of an asset in the economy, denoted by A, originally held by the initial old. The asset is used by people to store wealth but has no intrinsic value. The preferences of future generations are $\log c_{1t} + \beta_t \log c_{2,t+1}$, where c_{1t} is consumption of the good when young, $c_{2,t+1}$ is consumption of the good when old, and $\beta_t > 0$ is time-varying and measures people's impatience. Denote by q_t the relative price of the asset in terms of a perishable good produced by firms. Each firm produces the good according to the production function, $\exp(z) n_t$, where z is a level of technology and n_t is the total amount of productive time hired from the young. Firms maximise profits. Derive the equilibrium price of the asset and explain what happens to its value when people become more impatient (ie, they start to value their second-period consumption less).

[30 marks]

Section D

Question 7

What is the relative volatility of consumption in comparison to the volatility of investment over the business cycle? What explanation can you provide for this fact? [Hint: think in terms of the two-period OLG model in which people get income in both periods.] Which component of the expenditure side of GDP, when you decompose consumption and investment into further sub-components, is the most volatile?

[25 marks]

End of Paper