Queen Mary
University of London

May/June Examination Period 2023

ECN223: Selected Topics in Macroeconomics *Duration: 2 hours*

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Answer ALL questions

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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Examiner: Dr Edoardo Palombo

Question 1

Describe the stylised business cycle facts of the US economy. **[10 marks]**

Question 2

Consider a household that lives for two periods. Assume no initial assets and let the constant price level $P = 1$. Let w_1 and w_2 denote wages in periods 1 and 2, let i denote the interest rate and $\beta \in (0, 1)$ denote the discount factor. Each period the government taxes labour income, such that the post-tax wage is $(1 - \tau_w)w$ and that the tax rates are different in each period ($\tau_{w,1} \neq \tau_{w,2}$). Assume that the household derives its utility from consumption in both periods, denoted c_1 and c_2 respectively and leisure in both periods, denoted $1 - L_1$ and $1 - L_2$ respectively where L represents labour supply. Finally, assume a utility function $u(c, 1 - L) = log(c) + log(1 - L)$.

a) Set up the household's maximisation problem and derive the first-order conditions. **[5 marks]**

b) Derive the optimality conditions for consumption and labour supply in both periods. **[10 marks]**

c) What is the impact of a temporary increase in the first-period labour income tax rate ($\tau_{w,1}$) on labour supply (L_1) and consumption (c_1) in the first period? **[10 marks]**

Question 3

Assume that a firm produces according to the following production function: $Y_t = F(K_t)$. The firm owns the capital and has to make investment decisions I_t every period. Capital depreciates at rate δ every period and capital next period evolves as such: $K_{t+1} = (1 - \delta)K_t + I_t$. Assume that firms discount their profits with the interest rate i.

a) Obtain the optimality conditions for investment and capital. **[10 marks]**

b) Prove that the marginal product of capital is equal to the interest rate plus the depreciation rate. **[5 marks]**

c) Why is this theory of investment inadequate for the observed behaviour of firms and how can adjustment costs to investment overcome such shortcomings? **[10 marks]**

Question 4

Consider a two-period model of a household with the utility of consumption $u(C) = log(C)$ and a discount rate β. The path of the household's pre-tax income is Y_1 and Y_2. The government has a path of spending G_1 and G_2, and a path of taxes T_1 and T_2. Taxes are lump-sum and paid by the household. The interest rate is i for everyone. Suppose $i = 0$, $\beta = 1$, and $Y_1 - G_1 = Y_2 - G_2$.

a) Suppose the government balances its budget in each period. Write the intertemporal constraint of the household, and the optimal choices of consumption and savings/borrowing, given the path of government spending. **[10 marks]**

b) Suppose now the government runs a surplus by increasing taxes in the first period. How do household decisions change? Discuss how this result relates to Ricardian Equivalence. **[5 marks]**

c) Assume now that households are liquidity constrained and cannot borrow. How does this affect your answer to question 4b? **[5 marks]**

Question 5

Explain seignorage and the theory of "unpleasant monetarist arithmetic". Discuss their implications for government finances. Refer to the formal elements of the model (i.e., government constraint, theory of inflation, etc.) as appropriate to support your discussion. Is there empirical evidence in favour of those implications? **[20 marks]**

End of Paper