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Aggregate ECN (Macroeconomics)
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ECO 6206
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Final Exam

This is a closed book exam. The exam is worth 120 points. The exam totals 6 question. Each question is worth 20 points. Time: 7:00 p.m. to 9:45 p.m. Location: CBA 1-206.

Question I: Define/Explain the following (20 points).

1. Okun's Law.

2. Walrasian Model.

3. Real Business Cycle Models.

4. Euler Equation.

5. Competitive Equilibrium.

6. Hodrick-Prescott Filter.

7. Mundell-Fleming Model.

8. Phillips Curve.

9. Sunspot Equilibrium.

10. Coordination Failure Models.

11. Dynamic Inconsistency in Policymaking.

Question II: Data and Mundell (20 points).

1. Rank the following from highest to lowest: Average Share of durable consumption in GDP, Average Share of non-durable consumption in GDP and Average Share of services consumption in GDP.

2. The Mundell Effect: In the IS-LM model, how does a fall in expected inflation π^e affect Y ?

Question III: A simple Real Business Cycle model (20 points).

Consider the following economy, wherein the representative household

$$\max E_t \sum_{t=0}^{\infty} \beta^t \left[\ln c_t + b \frac{(1-l_t)^{1-\gamma}}{1-\gamma} \right] \qquad b > 0, \qquad \gamma > 0 \tag{1}$$

subject to,

$$y_t = k_t^{\alpha} (A_t l_t)^{1-\alpha} \tag{2}$$

$$k_{t+1} = k_t + I_t - \delta k_t \tag{3}$$

$$A_t = \rho A_{t-1} + \epsilon_t \tag{4}$$

where y_t, c_t, k_t, I_t, l_t refer to output, consumption, capital, investment and labor, respectively. A_t refers to technology shocks and ϵ_t are white noise disturbances. E_t is the expectation operator.

1. Explain what is the parameter b? If $b = 2/3$, what does this mean?
2. Explain what is the parameter γ? If $\gamma = 1$, write the expression for the momentary utility.
3. Explain in words what are equations (2), (3) and (4).
4. The model is missing one equation, write the missing equation to make the model complete.
5. Find the first-order condition that relates current leisure and consumption, given the wage.
6. Is leisure $(1 - l)$ constant?

Question IV: Balanced Budget in the Keynesian Model (20 points).

Suppose that planned expenditure is given by $E = C(Y - T) + I(i - \pi^e) + G$.

How do equal increases in G and T affect the position of the IS curve? Specifically, what is the effect on Y for a given level of i?

Question V: Efficiency Wages, Bargaining and Nash Equilibrium. (20 points).

Garino and Martin (1999): Summers states, "In an efficiency wage environment, firms that are forced to pay their workers premium wages suffer only second-order losses. In almost any plausible bargaining framework, this makes it easier for workers to extract concessions." This problem asks you to investigate this claim. Consider a firm with profits given by $\pi = [(eL)^{\alpha}/\alpha] - wL$, $0 < \alpha < 1$, and a union with objective function $U = (w - x)L$, where x is an index of its workers' outside opportunities, w is the wage rate and L is the number of workers. Assume that the firm and the union bargain over the wage w, once decided, the firm then chooses L taking w as given.

1. What is α? Why is α constrained between 0 and 1? If $\alpha = 1$, graph the labor demand.
2. What is e? Is e endogenous or exogenous? If endogenous, write the expression where e is on the left-hand side. If exogenous, can you propose a model to explain its behavior?
3. Suppose that $e \equiv 1$, what values of L does the firm choose, given w? What is the resulting level of profits?
4. Suppose that the firm and the union choose w to maximize $U^{1-\gamma}\pi^{\gamma}$, where $0 < 1 - \gamma < \alpha$ indexes the union's power in the bargaining. What is the level of w at the Nash Bargaining solution?

Question VI: Dynamic Inconsistency and Punishment (20 points).

Consider a policymaker whose objective function is $\sum_{t=0}^{\infty} \beta^t (y_t - a\pi_t^2/2)$, where $a > 0$, and $0 < \beta < 1$. Output (y_t) is determined by the Lucas Supply curve $y_t = \overline{y} + b(\pi_t - \pi_t^e)$, each period. Expected inflation π^e is determined as follows. If π has equaled $\widehat{\pi}$ (where $\widehat{\pi}$ is a parameter) in all previous periods, then $\pi^e = \widehat{\pi}$. [Hint: Think of $\widehat{\pi}$ as the announced/intended inflation by the policymaker.] If π ever differs from $\widehat{\pi}$, then $\pi^e = b/a$ in all subsequent periods.

1. What is a? Explain.
2. What is the equilibrium of the model in all subsequent periods if π ever differs from $\widehat{\pi}$?
3. Assume that $\beta < 1/2$, for what values of $\widehat{\pi}$ does the monetary authority choose $\pi = \widehat{\pi}$ (not to deviate) ? [Hint: to answer the question: a) write the expression for the benefit from deviating, b) write the expression for the cost from deviating, c) graph the benefit and cost as function of $\widehat{\pi}$, d) Quantitatively, find the range of $\widehat{\pi}$ over which the cost is higher than the benefit.] The following math tool will help you derive the benefit and cost: $\sum_{t=1}^{\infty} \beta^t = \beta + \beta^2 + \beta^3 + ... = \beta/(1-\beta)$.