Qualifying exam, Econ 7007 (June 2022)

Answer questions 1 through 4 and either 5(a) or 5(b). The prompt to "*discuss*" requires a coherent text in full sentences. Please write legibly. If possible, use class notation where formal detail is required.

1. (20pts) Define Harrod's three growth rates, and discuss how their equality (or lack thereof) serves as a framework for the assessment of demand- and supply-constrained macroeconomies.

2. (20pts) Provide a comprehensive outline of Goodwin's (1967) model of cyclical growth. Include Jacobian and phase diagram.

3. (20pts) Explain the effect of a change in labor's bargaining power in Goodwin's original model, as captured by real wage Philips Curve parameters. Why is the impact of such a change different in neo-Goodwinian versions that abandon Say's Law? Discuss.

4. (20pts) Lay out a two-dimensional neo-Goodwinian model with your choice of state variables, structure and behavioral functions. Analyze stability & dynamics, sketch a phase diagram, and provide comparative dynamics for shifts (i) in the savings propensity of capitalists, and (ii) the growth rate of Harrod-neutral technological progress. Compare results to the original classical growth cycle. Discuss.

5. (20pts) *Answer either (a) or (b)!* Critically compare and contrast ...

   (a) ... Goodwin's theory with "supermultiplier" literature: both build on classical approaches, but differ in their presuppositions. How so? Is one approach preferable to the other? Why? Discuss.

   (b) ... Goodwin (1967) with Shah and Desai (1981). Does the inclusion of the innovation possibility frontier change "everything"? Why or why not? Discuss.

Instructions: make sure your handwriting is legible especially since exams will be sent to faculty electronically! For most of the questions below, the answer will require use of formal detail (equations and/or graphs), but which **should be supported** by a brief discussion of the economic intuition.

1. Ramsey Growth Model – assume there is a fall in x, which is the labor-augmented rate of technical progress (the rate of growth of A). Note: where applicable, discuss shifts in the phase diagram and support it with relevant formal details!

(a) how does it affect the $\dot{k} = 0$ curve? Discuss and also use phase diagram.

(b) how does it affect the $\dot{c} = 0$ curve? Discuss and also use phase diagram.

(c) *at the time of change*, does c rise, fall, or stay the same, or?

(d) *at the time of change*, does $r - x$ rise, fall, or stay the same, or? Ignore depreciation.

(e) *in the long run*, does $r - x$ rise, fall, or stay the same, or?

2. Answer only **ONE** of the following questions.

(a) How does the cyclicality of the real wage differ across main models (RBC, and the Keynesian fixed-nominal wage, fixed-price, and efficiency wage models) studied in this class?

(b) What is the Lucas critique? What is its significance in economic theory and policy formulation-making?

3. The multiplier-accelerator. Consider the following model of income determination. 1) Consumption depends on the previous period's income $C_t = a + bY_{t-1}$. 2) The desired capital stock is proportional to the previous period's output: $K_t^* = cY_{t-1}$. 3) Investment equals the difference between the desired capital stock and the stock inherited from the previous period: $I_t = K_t^* - K_{t-1} = K_t^* - cY_{t-2}$. 4) Government purchases are constant: $G_t = \bar{G}$. 5) Output is given by $Y_t = C_t + I_t + G_t$.

(a) Express Y_t in terms of Y_{t-1}, Y_{t-2} and the parameters of the model.

(b) Suppose $b = 0.9$ and $c = 0.5$. Suppose there is a one-time disturbance to government purchases; specifically, suppose that $G = \bar{G} + 1$ in period *t* and is equal to $\bar{G}$ in all other periods. How does this shock affect output over time?

4. Consider the following model:

$$AS : y_t = \gamma(p_t - E_{t-1}p_t) + \alpha(E_{t-1}p_t - p_{t-1}) + u_t, \gamma, \alpha > 0 \quad (1)$$

$$AD : m_t - p_t = y_t + \varepsilon_t \quad (2)$$

with u, ε i.i.d. error terms with expected zero mean and finite variance. Find the reduced form equation for y_t i.e. solve for y_t. Does monetary policy affect the real economy? Explain.