Economics 6130-2
Macroeconomics I, Part 2
Practice Questions for Final

1 Overlapping Generations, I

2 period lives.
1 commodity per period, $l = 1$.
Stationary endowments:

$$\omega_0^1 = 2 > 0 \text{ for } t = 0$$
$$(\omega_t^t, \omega_t^{t+1}) = (3, 2) > 0 \text{ for } t = 1, 2, ...$$

Stationary preferences:

$$u_0(x_0^1) = 10 \log x_0^1 \text{ for } t = 0$$
$$u_t(x_t^t, x_t^{t+1}) = \log x_t^t + 10 \log x_t^{t+1} \text{ for } t = 1, 2, ...$$

Money taxation-transfer:

$$m_1^1 = 50,\ m_1^2 = 100, \qquad m_t^s = 0 \text{ otherwise}$$

Goods price of money is $p^m \geq 0$.

Derive the translated, reflected offer curve.

Analyze the global dynamics. Be precise. Find steady-state equilibria. Describe all possible paths. Include in your answer: hyperinflation, hyperdeflation, bursting bubbles, non-bursting bubbles.

2 Heterogeneous Capital

$$Y = C + Z_1 + 4Z_2 = 5K^{\frac{1}{3}}L^{\frac{2}{3}}$$
$$K_1 + 2K_2 = K$$
$$\dot{K_1} = Z_1$$
$$\dot{K_2} = Z_2$$
$$C = \frac{95Y}{100}$$
$$\dot{L} = \frac{L}{50}$$

Let p_i be the current price of a type i machine in terms of consumption, $i = 1, 2$.

2a. What restrictions on prices are imposed by momentary (i.e., static) equilibrium?

2b. What are the costs in terms of output Y of newly produced capital good 1 and capital good 2? What are the relative values of old machines of type 1 and type 2? Relate this to the costs of replacement.

2c. Let $\dot{p_i^e}$ be the expected change in p_i. What is the asset market clearing equation?

2d. Do the full dynamic analysis for the case of static expectations, i.e. $\dot{p_i^e} = 0$ for $i = 1, 2$.

2e. Do the full dynamic analysis for the case of short-run perfect foresight, i.e. $\dot{p_i^e} = \dot{p_i}$ for $i = 1, 2$.

2f. How do the dynamics for this heterogeneous capital model compare with those for the OG pure-exchange (or endowment) economy?

3 Overlapping Generations, II

You may use the following model and notation for most answers:
2 period lives.
l commodities
1 person per generation
$u_0(x_0), x_0 = x_0^1, \omega_0 = \omega_0^1, m_0 = m_0^1$ for $t = 0$
$u_t(x_t), x_t = (x_t^t, x_t^{t+1}), \omega_t = (\omega_t^t, \omega_t^{t+1}), m_t = (m_t^t, m_t^{t+1})$ for t = 1,2,...

3a. Define Pareto Optimality (PO).

3b. Define Weak Pareto Optimality (WPO).

3c. Define Short Run Pareto Optimality (SRPO).

3d. Give the precise relationships among PO, WPO, and SRPO.

3e. State the First Welfare Theorem for OG.

3f. State the Second Welfare Theorem for OG in two ways:

i. allowing only for reassigning the ω's

ii. allowing only for money taxes, $m_0, m_1, ..., m_t, ...$

3g. What is absence of money illusion? When does it obtain? How does it differ from the quantity theory?

3h. Precisely state the Phelps-Koopmans efficiency theorem.

3i. What are the connections between Phelps-Koopmans efficiency and welfare in the OG economy?

3j. Construct an economy in which oversaving is not the only source of inefficiency, namely in which short-run efficiency obtains but long-run efficiency does not. [Hint: You probably need more than one capital good.]

4 Optimal Growth

$$
\begin{aligned}
&Y = 10K^{1/3}L^{2/3} \\
&Y = C + Z \\
&\dot{K} = Z - K/10 \\
&\frac{\dot{L}}{L} = 0.02 \\
&\delta = 0.01 \\
&U\big(C/L\big) = \log\big(C/L\big) \\
&K(0)/L(0) = 2 \\
&T = \infty
\end{aligned}
$$

4a. Derive the Euler equation.

4b. Calculate k_{gr} and k_{mgr}.

4c. Draw the phase diagram.

4d. Do the full dynamic analysis.

Let $T < \infty$

4e. How is the problem altered?

4f. Precisely state the turnpike theorem.

5 Overlapping Generations, III

$\omega_0^1 = B > 0$ for $t = 0$
$(\omega_t^t, \omega_t^{t+1}) = (A, B) > 0$ for $t = 1, 2, ...$
$u_0(x_0^1) = (x_0^1)^D$ where $D > 0$, for $t = 0$
$u_t(x_t^t, x_t^{t+1}) = (x_t^t)^C (x_t^{t+1})^D$ where $(C, D) > 0$, for $t = 1, 2, ...$

For what values of $(A, B, C, D) > 0$ is the economy (a) Sumuelsonian or (b) Ricardian?