## SIMON FRASER UNIVERSITY

Department of Economics

Econ 808
Prof. Kasa
Macroeconomic Theory
Fall 2003

FINAL EXAM (December 5, 2003)

Answer the following questions True, False, or Uncertain. Briefly explain your answers. No credit without explanation. (5 points each).

1. According to the Mortensen-Pissarides matching model, equilibrium unemployment is too high.
2. Empirical evidence suggests that consumption responds excessively to labor income.
3. According to Barro's tax smoothing model, taxes should be constant.
4. According to Tobin's Q model, net investment is positive when the market value of capital exceeds its replacement cost.

The following questions are short answer. Be sure to explain and interpret your answer.
5. (10 points). Suppose that money demand is given by: $\ln (M / P)=\alpha-\beta i+\ln Y$, and that $Y$ is growing at rate $g_{Y}$. Assume that output and the real interest rate are unaffected by the growth rate of money, and that expected inflation equals actual inflation. What rate of inflation leads to the highest path of seignorage? (Hint: Does money growth equal inflation?)
6. (25 points). Suppose that aggregate supply is given by the Lucas supply curve

$$
y_{t}=\bar{y}+b\left(\pi_{t}-\pi_{t}^{e}\right) \quad b>0
$$

and suppose that monetary policy is determined by, $m_{t}=a+m_{t-1}+\varepsilon_{t}$, where $\varepsilon_{t}$ is a white noise disturbance. Assume that private agents do not know the current values of $m_{t}$ or $\varepsilon_{t}$; thus, $\pi_{t}^{e}$ is the expectation of $p_{t}-p_{t-1}$ given $m_{t-1}, \varepsilon_{t-1}, y_{t-1}$, and $p_{t-1}$. Finally, assume aggregate demand is given by, $y_{t}=m_{t}-p_{t}$ (ie, the quantity theory, with velocity equal to unity).
(a) Find $y_{t}$ in terms of $m_{t-1}, m_{t}$, and any other variables or parameters that are relevant.
(b) Suppose monetary policy is initially determined as above, with $a>0$, and that the monetary authority then announces it is switching to a new regime where $a$ is 0 . Suppose private agents believe that the probability the announcement is true is equal to $\rho$. What is $y_{t}$ in terms of $m_{t-1}, m_{t}, \bar{y}, b$, and the initial value of $a$ ?
(c) Using these results, describe how an empirical examination of the money-output relationship might be used to measure the credibility of the announced regime change.
7. (20 points). Suppose the only assets in the economy are infinitely lived trees. Output equals the fruit of the trees, which is exogenous and nonstorable. Thus, $C_{t}=Y_{t}$, where $Y_{t}$ is the exogenously determined per capita output, and $C_{t}$ is per capita consumption. Assume that initially each agent owns the same number of trees. Note that since agents are assumed to be identical, the equilibrium price of a tree must be such that each agent does not wish to either increase or decease his or her holdings of the tree.
Let $P_{t}$ denote the price of a tree in period- $t$. Assume that if a tree is sold, the sale occurs after the original owner receives that period's output (ie, prices are 'ex-dividend'). Finally, assume that the representative agent maximizes,

$$
E_{t} \sum_{j=0}^{\infty} \beta^{j} \ln C_{t+j}
$$

(a) Write down the Euler equation for asset prices.
(b) Assume that $\lim _{s \rightarrow \infty} E_{t}\left[\beta^{s}\left(P_{t+s} / Y_{t+s}\right)\right]=0$. Given this assumption, iterate your answer to part (a) forward to solve for $P_{t}$. (Hint: Impose the equilibrium condition $C_{t+j}=Y_{t+j}$ for all $j$.)
(c) Explain intuitively why an increase in expected future dividends does not affect asset prices. (Hint: Think in terms of income and substitution effects.)
(d) Note that in general consumption does not follow a random walk in this model. Why not? What's the key difference between this model and Hall's (1978) model?
8. (25 points). Consider a worker searching for a job. Wages, $w$, have a probability density across jobs, $f(w)$, that is known to the worker. Let $F(w)$ be the associated cumulative distribution function. Each time the worker samples a job from this distribution, he or she incurs a cost of $C$, where $0<C<E(w)$. When the worker samples a job, he or she can either accept it (in which case the process ends) or sample another job. Assume the worker seeks to maximize the expected value of $w-n C$, where $w$ is the wage paid in the job the worker eventually accepts and $n$ is the number of jobs the worker ends up sampling.
Let $V$ denote the expected value of $w-n^{\prime} C$ of a worker who has just rejected a job, where $n^{\prime}$ is the number of jobs the worker will sample from that point on.
(a) Explain why the worker accepts a job offering $\hat{w}$ if $\hat{w}>V$, and rejects it if $\hat{w}<V$.
(b) Derive the Bellman equation for $V$.
(c) Show that an increase in $C$ reduces $V$.
(d) Does the worker ever want to accept a job that he or she has previously rejected?
(e) Suppose $w$ is distributed uniformly on $[\mu-a, \mu+a]$ and that $C<\mu$. Find $V$ in terms of $\mu, a$, and $C$. How does an increase in $a$ affect $V$ ? Explain intuitively.

