ECONOMICS 7344, Spring 2004
Bent E. Sørensen
February 22, 2004

Midterm Exam 1 — 7 questions. All sub-questions carry equal weight.

1. (12%) Let y_t be a stationary time series, and $\gamma(k)$ the k-th order autocorrelation.
a) Prove that $\gamma(k) = \gamma(-k)$.
b) If $a(L)$ is the lag polynomial $1 + .5 * L$, find the inverse of $a(L)$.
c) If $b(L) = 1 + .3 * L - 2 * L^2$ find $a(L) * b(L)$.

2. (10%) a) In the IS-LM model show graphically (using the IS and LM curves [mark clearly which one is which] and explaining which one moves) the effect an increase in government consumption on output and the interest rate.
b) In the IS-LM model, if the government keeps the interest rate constant rather than the money supply, would the effect an increase in government consumption on output be larger or smaller or the same as in the standard IS-LM model?

3. (17%) Explain why imperfect competition may lead to in-optimally low output. (You can use equations from the book, or explain it in words, as long as it is clear.)

4. (24%) Consider the situation where an agent is consuming N different goods C_i; $i = 1, ..., N$. The price of good i is p_i and the agents utility function is $U(C_1, ..., C_N) = C$, where C is a quantity index for consumption defined by

$$C \;=\; (\Sigma_{i=1}^{N} C_i^{\frac{\eta-1}{\eta}})^{\frac{\eta}{\eta-1}}$$

a) Find the first order conditions for utility maximization assuming the consumer has income Y available for consumption of the N goods.
b) Use the budget constraint to find the optimal amount of C_i in terms of the prices and the income available.
c) Find the price index P such that the optimal value of the quantity index C satisfies $Y = P * C$.

5. (20%) Explain in detail the logic of Lucas' imperfect information model. (You don't have to derive the equations, or even write down equations, but if you use words you need to make sure that you are precise.)

6. (7%) Give one explanation for why the AS curve in the AS-AD model may be upward sloping.

7. (10%) Explain what is meant by "menu costs" and why menu costs may lead to price stickiness. (A brief explanation of the main point is sufficient.)