SUNY-Binghamton Economics 614 Macroeconomic Theory II
Problem set on habit formation, money demand in Christiano, Eichenbaum Evans model

1) Consider an economy with "habit formation" in consumption. The representative household acts to maximize:

$$E\left[\sum_{t=0}^{\infty}\beta^t\left(\frac{(c_t-bc_{t-1})^{1-\theta}}{1-\theta}-zl_t^{\,2}\right)\right] \quad where \;\; 0<\beta<1$$

where z is a parameter, b is a parameter and other notation is as usual: l is the fraction of his time that a household-person supplies as labor and c is his consumption.The technology parameter A is has a long-run trend growth rate g. Let r denote the real interest rate, equal to the return to capital after depreciation, and w denote the real wage per unit of labor (not per efficiency-unit of labor).

a) Write down the "intratemporal first-order condition" that relates consumption c in a period to the same period's real wage w and labor-supply fraction l, and any other relevant variables.

b) In a nonstochastic long-run steady state, both the real wage and consumption must be growing at rate g. That is to say,

$$c_{t+1}/c_t = w_{t+1}/w_t = e^g$$

Using this fact and your answer to a), demonstrate that the value of the felicity-function parameter θ must be one, so that the utility function is equivalent to:

$$E\left[\sum_{t=0}^{\infty}\beta^t\left(\ln(c_t-bc_{t-1})-zl_t^{\,2}\right)\right] \quad where \;\; 0<\beta<1$$

2) Consider money demand in the CEE model. The representative agent household acts to maximize;

$$E_t\left[\sum_{\tau=0}^{\infty}\beta^\tau\left(\ln(c_{t+\tau}-bc_{t+\tau-1})-\psi_0 h^2_{\;t+\tau}+\psi_q\frac{q^{1-\sigma}}{1-\sigma}\right)\right] \quad where \;\; 0<\beta<1 \; (11)$$

where c is consumption, h is labor hours. The real money balance is $q = Q/P$. Q is the money balance, P is the price of output (consumption). The budget constraint ("household's asset evolution equation") is (simplifying it a bit):

$$M_{t+1} = R_t\left[M_t - Q_t\right] + Q_t + W_{jt}h_{jt} + A_{jt} + D_t + R^k{}_t u_t\bar{k}_t - P_t\left[i_t + c_t + a(u_t)\bar{k}_t\right] \qquad (12)$$

i_t is the houshold's purchases of investment goods. R_t is the *gross* rate of interest paid on deposits with the "financial intermediary." A gross rate of inturest is the ordinary nominal interest rate plus one. For the other variables, see the paper.

Derive an equation that gives the household's demand for real money balance q_t as a function of R_t, c_t and c_{t-1}.