```
function CH10
%%Process for growth rate of money
% tau(t) = rho_tau*tau(t-1)+B_tau+C_tau*ep_tau
%%Process for growth rate of productivity
% g(t) = rho_g*g(t-1)+B_g+C_g*ep_g
% Let's choose some basic moments for our model
% preferences parameters
Rho = .9; % elasticity parameter in Composite consumption
beta = 0.98; % discount preferences parameter
Rbeta = Rho*beta;
mean_tau = .1; % so mean inflation is 10%
mean_g = .02; % so mean growth is 2%
rho_tau = 0.1; %0.1
rho_g = 0.95;
B_tau = mean_tau*(1 - rho_tau); %obtained by taking expectations in the
tau process
B_g = mean_g*(1 - rho_g); %obtained by taking expectations in the g
process
C_tau = .007; % governs how volatile tau is
C_g = .007; % governs how volatile g is
vf = 1/ (1+.5); % setting gamma = .5 so Frisch elasticity is 2
% We need to initialize our matrices
% Generally good to use steady state values here
TAU = [mean_tau];
G = [mean_g];
L = [(Rbeta/(1+mean_tau))^vf];
bar_L = [(Rbeta/(1+mean_tau))^vf];
M = [1];
Z = [1];
Y_level = [Z(1)*L(1)];
bar_P = [M(1)/Y_level(1)];
infl = [(1+mean_tau)/(1+mean_g)];
Y_gr = [1+mean_g];
T = 50;
for i=2:T
ep_tau = randn; % drawing a standard normal with mean o and std 1
tau = rho_tau*TAU(i-1)+B_tau+C_tau*ep_tau;
TAU(i) = tau;
ep_g = randn;
g = rho_g*G(i-1)+B_g+C_g*ep_g;
G(i) = g;
Z(i) = Z(i-1)*(1+g);
M(i) = M(i-1)*(1+tau);
%%%%%%%%%%%% New Stuff for NK %%%%%%%%%%%%%%%%%%%%%
e_tau = rho_tau*TAU(i-1) + B_tau; %expected tau
e2_tau = rho_tau*e_tau + B_tau; %second period expected tau
bar_L(i) = (Rbeta / (1+e2_tau))^vf; %forecasted labor
L(i) = (1+tau)*bar_L(i)/(1+e_tau); %realized labor
bar_P(i) = M(i-1)*(1+e_tau)/(Z(i)*bar_L(i)); %price level
%(forecasted and observed prices are equal)
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
Y_level(i) = Z(i)*L(i);
infl(i) = bar_P(i)/bar_P(i-1); % Gross growth rate of prices
Y_gr(i) = Y_level(i)/Y_level(i-1); % Gross growth rate of output
L_gr(i)= L(i)/L(i-1);
end
figure(1)
```

```
scatter(TAU(2:T),L(2:T))
title('Our Phillips Curve')
xlabel('Money Growth')
ylabel('Labor')
figure(2)
yyaxis left
plot([3:T]',infl(3:T)','LineWidth',3)
ylabel('Growth Rate')
yyaxis right
plot([3:T]',L(3:T)',[3:T]',bar_L(3:T)','LineWidth',3)
xlabel('Time')
legend('Inflation','Labor','Target Labor')
% figure(3)
% yyaxis left
% plot([2:T]',bar_P(2:T)','LineWidth',3)
% yyaxis right
% plot([2:T]', Y_level(2:T)','LineWidth',3)
% xlabel('Time')
% ylabel('Levels')
% legend('Prices','Output')
%
% figure(4)
% yyaxis left
% plot([2:T]',infl(2:T)','LineWidth',3)
% yyaxis right
% plot([2:T]',Y_gr(2:T)','LineWidth',3)
% xlabel('Time')
% ylabel('Growth Rates')
%legend('Inflation','Output Growth')
disp('Correlation between Money gr, Inflation, L gr')
corrcoef([1+TAU(2:T)' infl(2:T)' L_gr(2:T)'])
%disp('Correlation between Money gr, Inflation, Y gr')
%corrcoef([1+TAU(2:T)' infl(2:T)' Y_gr(2:T)'])
% put everything here in gross growth terms so 1+tau
% dropped the first observation since not stochastic draw
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Part 2: Correlations and Long-Run Growth rates
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
lrg_M = ((1+M(11:T))./(1+M(1:T-10))).^(1/10);
lrg_Y = (Y_level(11:T)./Y_level(1:T-10)).^(1/10);
lrg_L = (L(11:T)./L(1:T-10)).^(1/10);
lrg_P = (bar_P(11:T)./bar_P(1:T-10)).^(1/10);
disp('Correlation matrix for long-run money gr, inflation and L gr')
corrcoef([lrg_M' lrg_P' lrg_L'])
% 10 year rolling windows
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Part 3: Impulse response
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
imp_Shocks = zeros(10,1);
imp_Shocks(2) = 1; % so the impulse occurs in period 2 to trace out
change.
imp_bar_L = [(Rbeta/(1+mean_tau))^vf];
imp_L = [(Rbeta/(1+mean_tau))^vf];
imp_Tau = [mean_tau];
imp_bar_P = [1/imp_L(1)];
for i=2:10
    i;
```

```
tau = rho_tau*imp_Tau(i-1)+B_tau+C_tau*imp_Shocks(i);
imp_Tau(i) = tau;
e_tau = rho_tau*imp_Tau(i-1) + B_tau;
e2_tau = rho_tau*e_tau + B_tau;
imp_bar_L(i) = (Rbeta / (1+e2_tau))^vf;
imp_L(i) = (1+tau)*imp_bar_L(i)/(1+e_tau);
imp_bar_P(i) = M(i-1)*(1+e_tau)/(Z(i)*bar_L(i));
end
imp_L;
imp_bar_P;
figure(3)
plot([1:10],(1+imp_Tau)./(1+imp_Tau(1)),[1:10],imp_L'./imp_L(1)',[1:10],i
mp_bar_L'./imp_bar_L(1)','LineWidth',3)
legend('Tau','Labor','Target Labor')
```