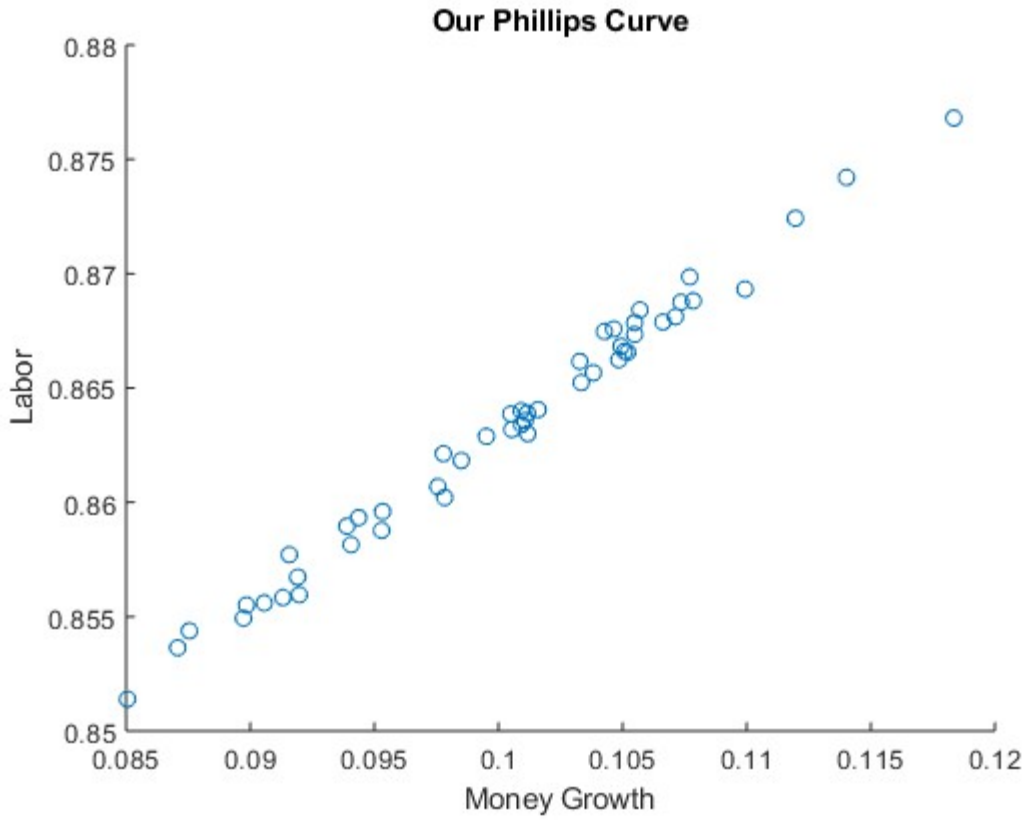
```
function CH10

% Let's choose some basic moments for our model

Rho = .9;   % elasticity parameter in C

beta = 0.98;

Rbeta = Rho*beta;

mean_tau = .1; % so mean inflation is 10%

mean_g = .02; % so mean growth is 2%

rho_tau = 0.1;

rho_g = 0.95;

beta = 0.98;

B_tau = mean_tau*(1 - rho_tau);

B_g = mean_g*(1 - rho_g);

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 = [(beta/(1+mean_tau))^vf];

bar_L = [(beta/(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;
```

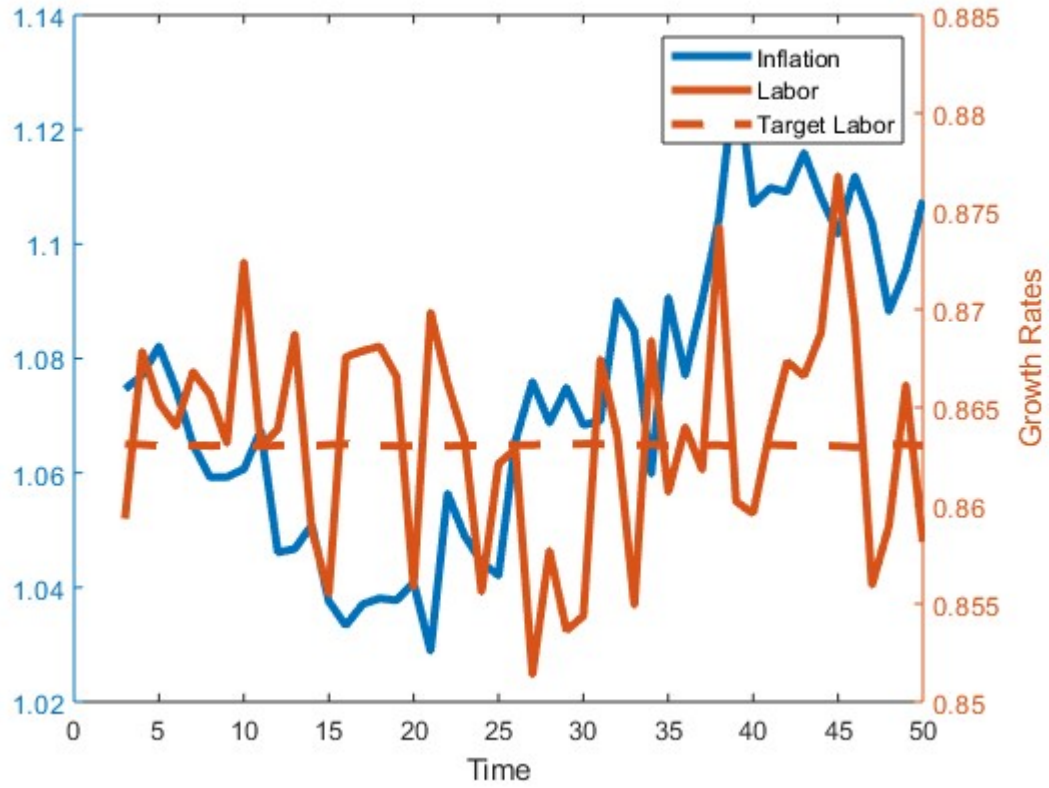
```
for i=2:T,

    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;

    e2_tau = rho_tau*e_tau + B_tau;

    bar_L(i) = (Rbeta / (1+e2_tau))^vf;

    L(i) = (1+tau)*bar_L(i)/(1+e_tau);

    bar_P(i) = M(i-1)*(1+e_tau)/(Z(i)*bar_L(i));

    %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

    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

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)
yyaxis right
plot([3:T]',L(3:T)',[3:T]',bar_L(3:T)','LineWidth',3)
xlabel('Time')
ylabel('Growth Rates')
legend('Inflation','Labor','Target Labor')

% figure(3)
% yyaxis left
```

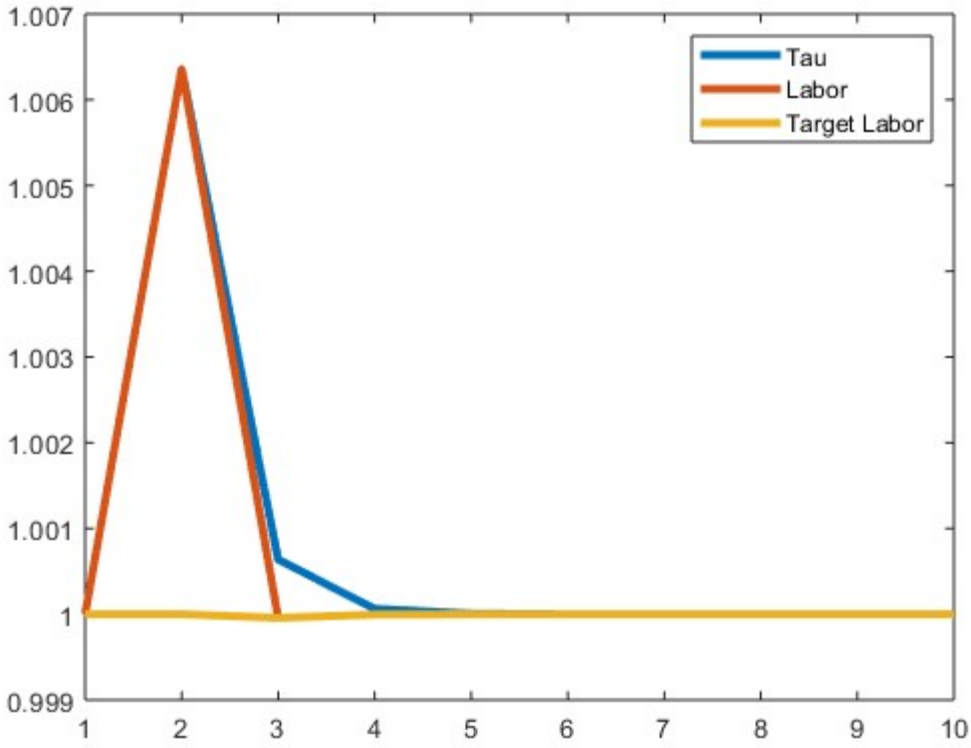
```
% plot([2:T]',bar_P(2:T)','LineWidth',3)
% yyaxis right
% plot([2:T]', Y_level(2:T)','LineWidth',3)
% xlabel('Time')
% ylabel('Levels')
% legend('Prices','Output')
%
% figure(4)
% yyaxis left
% plot([2:T]',infl(2:T)','LineWidth',3)
% yyaxis right
% plot([2:T]',Y_gr(2:T)','LineWidth',3)
% xlabel('Time')
% ylabel('Growth Rates')
%legend('Inflation','Output Growth')




disp('Correlation between Money gr, Inflation, 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_P = (bar_P(11:T)./bar_P(1:T-10)).^(1/10);


disp('Correlation matrix for long-run money, output and inflation')

corrcoef([lrg_M' lrg_Y' lrg_P'])

% 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],imp_bar_L'./i
mp_bar_L(1)','LineWidth',3)
%legend('Tau','Labor','Target Labor','Price Index')
legend('Tau','Labor','Target Labor')
```

```
Correlation between Money gr, Inflation, Y gr

ans =

    1.0000   -0.0274    0.2701
   -0.0274    1.0000   -0.9693
    0.2701   -0.9693    1.0000

Correlation matrix for long-run money, output and inflation

ans =

    1.0000   -0.6989    0.6877
   -0.6989    1.0000   -0.9891
    0.6877   -0.9891    1.0000
```


Our Phillips Curve
Labor
Money Growth
0.88
0.875
0.87
0.865
0.86
0.855
0.85
0.085
0.09
0.095
0.1
0.105
0.11
0.115
0.12


Inflation
Labor
Target Labor
Growth Rates
Time
1.14
1.12
1.1
1.08
1.06
1.04
1.02
0.885
0.88
0.875
0.87
0.865
0.86
0.855
0.85
0
5
10
15
20
25
30
35
40
45
50



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