```
% Monetary policy schock

%close all;

%clear all;

%gamma_all = [0.3 0.6 0.9];

%for ii=1:length(gamma_all)

%gamma = gamma_all(ii);

%save DSGE_indexation_parameters gamma;

%dynare DSGE_indexation.mod noclearall

% Variables

var y pi ynat x r rnat i g G cbar q a hbar s_i;

varexo e_G e_cbar e_a e_hbar e_i;

parameters beta sigma alpha theta omega kappa gamma nu sc rho phi_pi phi_x pibar xbar rho_G
rho_cbar rho_a rho_hbar rho_i;


% Calibration


load DSGE_MP_parametars;

set_param_value ('rho_i', rho_i);


beta = 0.99;     % discount factor

sigma = 1/0.16;  % intertemporal elasticity of substitution of private expenditure

alpha = 0.66;    % Calvo parameter (how frequently producers' prices change = 3 quarters)

theta = 7.88;    % elasticity of the demand function for good i (implies 15% mark-up)

omega = 0.63-sigmaΛ(-1);     % elasticity of marginal cost function with respect to its first argument

kappa = (((1-alpha)*(1-alpha*beta))/alpha)*(((1/sigma)+omega)/(1+omega*theta)); % slope parameter
in New Keynesian Philips Curve
```

```
gamma = 0.6;    % the degree of indexation to the past inflation

nu = 1/9.5;     % inverse of the Frisch elasticity of labour supply

sc = 0.6;       % non-stochastic SS share of private expenditure in total aggregate demand

rho = 0.7;      % Taylor rule (inertia)

phi_pi = 1.5;   % Taylor rule (weight on inflation)

phi_x = 0.5/4;  % Taylor rule (weight on output gap)

pibar = 0.01;   % Taylor rule (1% model consistent inflation target)

xbar = ((1-beta)*pibar)/kappa;  % Taylor rule


% Shock processes

rho_G = 0.8;

rho_cbar = 0.8;

rho_a = 0.8;

rho_hbar = 0.8;

rho_i = 0.6;


% Model


model(linear);

% (1) IS curve

x = x(+2)-sigma*(i-pi(+2)-rnat);

% (2) Phillips curve

pi = beta*(pi(+2)+kappa*x;

% (3) Natural level of output

ynat = (sigma^(-1)*g+omega*q)/(sigma^(-1)+omega);
```

```
% (4) Exogenous disturbances term g

g = G+sc*cbar;

% (5) Exogenous disturbances term q

q = (1+omega^(-1))*a+omega^(-1)*nu*hbar;

% (6) Output gap

x = y-ynat;

% (7) Real interest rate

r = i-pi(+2);

% (8) Natural rate of interest

rnat = sigma^(-1)*((g-ynat)-(g(+2)-ynat(+2)));

% (9)  Taylor rule (case with autocorrelation)

i-pibar = rho*(i(-1)-pibar)+phi_pi*(pi-pibar-rho*(pi(-1)-pibar))+phi_x*(x-xbar-rho*(x(-1)-xbar))+s_i;

% (10)-(14) Shock processes

G = rho_G*G(-1)+e_G;

cbar = rho_cbar*cbar(-1)+e_cbar;

a = rho_a*a(-1)+e_a;

hbar = rho_hbar*hbar(-1)+e_hbar;

s_i = rho_i*s_i(-1)+e_i;

end;



% Computation


shocks;

var e_G; stderr 1;
```

```
var e_cbar; stderr 1;

var e_a; stderr 1;

var e_hbar; stderr 1;

var e_i; stderr 1;

end;


check;


stoch_simul(irf=20,noprint,nograph) x pi i r s_i;



time=1:20;

font = 'Times New Roman';

font_size_axes = 18;

font_size_title = 20;

set(0,'defaultfiguretoolbar','none');

set(0,'DefaultAxesFontName',font,'DefaultAxesFontSize',font_size_axes);

figure

subplot(2,3,1)

plot(zero_length',zero,'rho-.','LineWidth',1.5)

hold on

plot(time',rho =0.5 ,'g-o',time',rho =0.6 ,'b-o',time',rho =0.7 ,'r-o','LineWidth',2.5)

title('Monetary policy shock','FontName',font,'FontSize',font_size_title)


subplot(2,3,2);
```

```
plot(zero_length',zero,'k-.','LineWidth',1.5)
hold on
plot(time',i(:,1),'g-o',time',i(:,2),'b-o',time',i(:,3),'r-o','LineWidth',2.5)
title('Nominal interest rate','FontName',font,'FontSize',font_size_title)

subplot(2,3,3)
plot(zero_length',zero,'k-.','LineWidth',1.5)
hold on
plot(time',x(:,1),'g-o',time',x(:,2),'b-o',time',x(:,3),'r-o','LineWidth',2.5)
title('Output gap','FontName',font,'FontSize',font_size_title)

subplot(2,3,4)
plot(zero_length',zero,'k-.','LineWidth',1.5)
hold on
plot(time',pi(:,1),'g-o',time',pi(:,2),'b-o',time',pi(:,3),'r-o','LineWidth',2.5)
title('Inflation','FontName',font,'FontSize',font_size_title)

subplot(2,3,5);
p1 = plot(zero_length',zero,'k-.','LineWidth',1.5);
hold on
p2 = plot(time',r(:,1),'g-o',time',r(:,2),'b-o',time',r(:,3),'r-o','LineWidth',2.5);
title('Real interest rate','FontName',font,'FontSize',font_size_title)
set(suptitle('Monetary policy shock simulations using different degrees of indexation to past inflation parameter values (\gamma)'),'FontName',font,'FontSize',font_size_title)
legend([p2(1) p2(2) p2(3)],'\gamma = 0.3','\gamma = 0.6','\gamma = 0.9')
```