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% Blancard Weil Model in discrete time
% _____________________________________
%
% Three permanent shocks are introduced in order to study
% the dynamic behavior of the model
%
% 1. A 1 per cent shock to the pure rate of time preference (endval
x 1.01)
% 2. A 1 per cent shock to population growth (endval z x 1.01)
% 3. A 1 per cent shock to total factor productivity (endval a 1.01)
%
% _____________________________________
%
% Endogenous Variables:
% y output, k capital, c consumption
% w real wage, r real interest rate, s savings rate
%
% Exogenous Variables and Shocks
% a total factor productivity, x shock to the pure rate of time
preference
% z shock to population growth
%
% Parameters
% alpha share of capital in production, delta depreciation rate
% n population growth rate, g rate of technical progress
% rho pure rate of time preference
% theta inverse of intertemporal elasticity of substitution
%
% _____________________________________


var y k c w r s gy;
varexo a x z;

parameters alpha delta n g rho;

alpha=0.333;
delta=0.03;
n=0.01;
g=0.02;
rho=0.02;

model;

y=a*(k(-1)^alpha);
r=(alpha*a*k(-1)^(alpha-1))-delta;
c(+1)=(((((1+r)/(1+(rho*x)))*(1/(1+g)))*c)
-((n*z*rho*x)/((1+rho*x)*(1+n*z)*(1+g)))*k);
k=(1/((1+n*z)*(1+g)))*((y-c)+(1-delta)*k(-1));
w=(1-alpha)*a*k(-1)^(alpha);
s=(y-c)/y;
gy=(y-y(-1))/y(-1);

end;
```

```
initval;

k=5.3;
c=1.38;
y=1.7;
a=1;
r=0.075;
w=1.16;
x=1.0;
z=1;

end;

steady;

endval;

k=5.3;
c=1.38;
y=1.7;
a=1.01;
r=0.075;
w=1.16;
x=1.0;
z=1.0;

end;

steady;
check;

simul(periods=150);

% Plotting Capital Output Consumption Real Wage Real Interest Rate
Savings Rate

subplot(3,2,1); plot(k(1:80,1)); title('Capital');
subplot(3,2,2); plot(y(1:80,1)); title('Output');
subplot(3,2,3); plot(c(1:80,1)); title('Consumption');
subplot(3,2,4); plot(w(1:80,1)); title('Real Wage');
subplot(3,2,5); plot(r(1:80,1)); title('Real Interest Rate');
subplot(3,2,6); plot(s(1:80,1)); title('Savings Rate');
```