STATIONARY POLICIES

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Stationary policy are consumption and labor choices for each state such that both the endogenous state variables x, \rho are constant at arbitrary but fixed values This script explores the numerical existence of stationary policies for a 3 shock process over a fixed grid. Given a

$$\begin{bmatrix} \bar{x} & \bar{\rho} \end{bmatrix}$$

the set of constraints to the BM are used to solve consumption and labor choices for both the agent such that the

$$\begin{bmatrix} x'(s) & \rho'(s) \end{bmatrix} = \begin{bmatrix} \bar{x}, \bar{\rho} \end{bmatrix} \quad \forall s$$

In terms of accounting we are solving for 4 | S | unknowns (c1,c2,l1,l2) using 3|S|+1 equations (Implementability, Wage, Resource, Bond Euler Equation)

Modify the shock process

I extend the shock process to have g(3) which is 10percent higher than g(2)

```
  clc
 clear all
 close all
 warning off
 SetPath
InitData=load('csigmaMed');
Para=InitData.Para;
Para.g=[Para.g max(Para.g)*1.1 max(Para.g)*1.2];
n=length(Para.g);
NewPh=1/length(Para.g);
Para.P=NewPh*ones(1,length(Para.g)-1);
Para.P=[Para.P 1-sum(Para.P)];
```

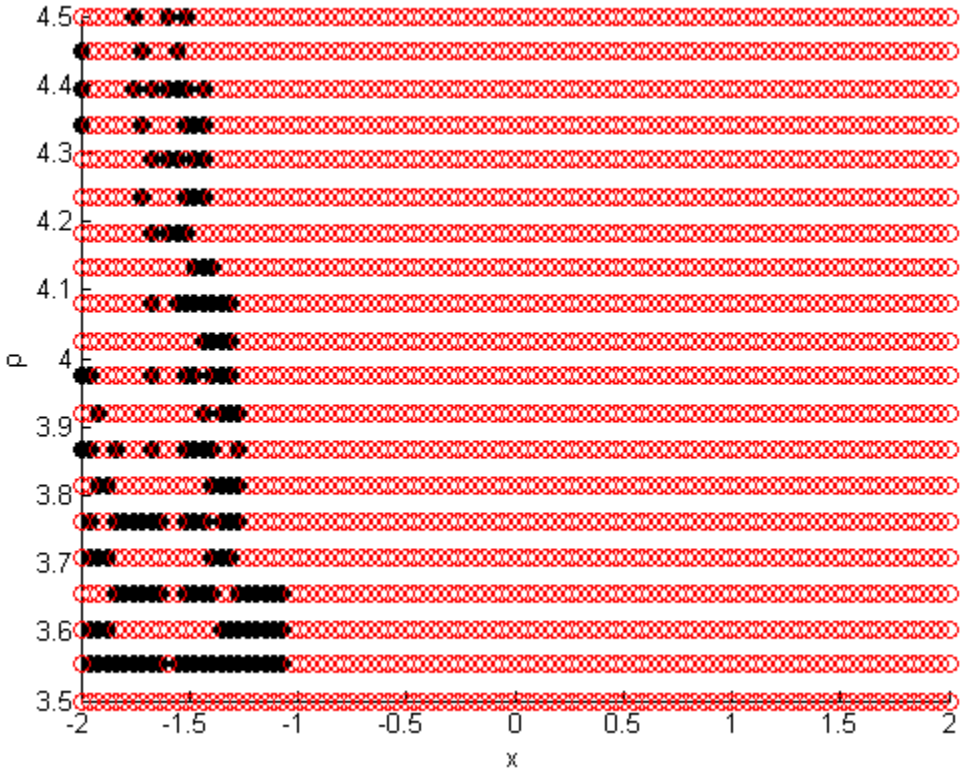
Solve for the stationary policies

```
xGrid=linspace(-2,2);
rhoGrid=Para.RGrid;
options=optimset('Display','off');
zInit=ones(4*n,1)*.5;
domainPolicyExists=[];
domainPolicy=[];
domainPolicyFail=[];
for xind=1:length(xGrid)
    for rhoind=1:length(rhoGrid)
```

```
        [z,res,exitflag]=fsolve(@(z) StationaryPolicyRes(z,xGrid(xind),rhoGrid(rhoi
        StationaryPolicy(xind,rhoind).exitflag=exitflag;
        StationaryPolicy(xind,rhoind).residuals=res;
        StationaryPolicy(xind,rhoind).z=z;
        if exitflag==1
            zInit=z;
            domainPolicyExists=[ domainPolicyExists ;xGrid(xind) rhoGrid(rhoind)];
        else
            domainPolicyFail=[ domainPolicyFail ;xGrid(xind) rhoGrid(rhoind)];
        end
 domainPolicy=[ domainPolicy; [xGrid(xind) rhoGrid(rhoind)]];
    end
end
```

Results

```
scatter(domainPolicyFail(:,1),domainPolicyFail(:,2),'k','filled')
hold on
scatter(domainPolicyExists(:,1),domainPolicyExists(:,2),'r')
xlabel('x')
ylabel('\rho')
```



Remarks

The black dots are points in the domain where stationary policies did not exist. A good sign is that all these are with x <0 since the steady state (for the two shock case) always had x >0. Also as a check I used the 2 shock process and the existence of stationary policies fail more or less in the same region

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