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%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Show the effect of inefficient blocking
% for the labor supply model
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
clear;

% Set random number generator, start stop watch, open output file
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
rand('state',37); % set arbitrary seed for uniform draws
randn('state',37); % set arbitrary seed for normal draws

tic; % start stop watch

% Load & prepare data
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
load c:\klaus\AAEC6564\mlab\worksp\labordata;
%We will use Mroz's (1987) labor data described in Greene (5th edition),
%p. 51

% Contents of Data (columns)

%1      LFP = A dummy variable = 1 if woman worked in 1975, else 0
%2      WHRS = Wife's hours of work in 1975
%3      KL6 = Number of children less than 6 years old in household
%4      K618 = Number of children between ages 6 and 18 in household
%5      WA = Wife's age
%6      WE = Wife's educational attainment, in years
%7      WW = Wife's average hourly earnings, in 1975 dollars
%8      RPWG = Wife's wage reported at the time of the 1976 interview (not =
1975 estimated wage)
%9      HHRS = Husband's hours worked in 1975
%10     HA = Husband's age
%11     HE = Husband's educational attainment, in years
%12     HW = Husband's wage, in 1975 dollars
%13     FAMINC = Family income, in 1975 dollars
%14     WMED = Wife's mother's educational attainment, in years
%15     WFED = Wife's father's educational attainment, in years
%16     UN = Unemployment rate in county of residence, in percentage points.
%17     CIT = Dummy variable = 1 if live in large city (SMSA), else 0
%18     AX = Actual years of wife's previous labor market experience

f=find(data(:,1)==0); % we only include women that worked in 1975
data(f,:)=[];

y=log(data(:,2).*data(:,7)); %dependent variable = log(hrs worked* hourly
wage)
KL6=data(:,3); %number of children under 6
K618=data(:,4); % Number of children between ages 6 and 18 in household
age=data(:,5);
age2=age.^2;
edu=data(:,6); %years of education

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n=length(y);

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% Group X into 3 blocks
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

X=[ones(n,1) age age2 edu KL6 K618];
X1=X(:,1:2);
X2=X(:,3:4);
X3=X(:,5:6);

k1=size(X1,2);
k2=size(X2,2);
k3=size(X3,2);
k=k1+k2+k3;

% Estimation
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% starting values, priors, and tuners
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% general elements
r1=5000; % burn-in
r2=10000; % keepers
R=r1+r2;

% generic OLS
bols=inv(X'*X)*X'*y;
res=y-X*bols;
s2=(res'*res)/(n-k);

% elements for beta1
mu01=zeros(k1,1);
V01=eye(k1)*100;
betaldraw=bols(1:k1);

% elements for beta2
mu02=zeros(k2,1);
V02=eye(k2)*100;
beta2draw=bols(k1+1:k1+k2);

% elements for beta3
mu03=zeros(k3,1);
V03=eye(k3)*100;
beta3draw=bols(k1+k2+1:end);

% elements for sig2
sig2draw=s2; % use OLS variance as starting draw for Gibbs Sampler
v0=1/2;
tau0=1/2; % diffuse prior shape and scale

[beta1mat,beta2mat,beta3mat,sig2mat]=...

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gs_normal_blocked(X,X1,X2,X3,y,n,k,k1,k2,k3,r1,r2,mu01,V01,betaldraw,...
mu02,V02,beta2draw,mu03,V03,beta3draw,v0,tau0,sig2draw);

'GS done'

% put all draws together & run diagnostics
allmat=[betalmat;beta2mat;beta3mat;sig2mat];
kdiag=klausdiagnostics_greater0(allmat);

[fid]=fopen('c:\klaus\AAEC6564\mlab\logs\mod2_blocking.txt','w');
if fid==-1
    warning('File could not be opened');
    return
else
    disp('File opened successfully');
end

fprintf(fid,'total number of iterations =\t%6.0f \n',R);
fprintf(fid,'burn-in iterations =\t%6.0f \n',r1);
fprintf(fid,'\n');

fprintf(fid,'OLS betas \t%6.3f\n',bols);
fprintf(fid,'OLS s2 \t%6.3f\n',s2);
fprintf(fid,'\n');
fprintf(fid,'\n');

% beta stuff
out=kdiag(1:k,:);
fprintf(fid,'Output table for betas \n\n');
fprintf(fid,'mean\t\tstd\t\ttp(>0)\t\ttnse\t\ttIEF\t\ttm*\t\tcd\n\n');
fprintf(fid,'%6.3f\t%6.3f\t%6.3f\t%6.3f\t%6.3f\t%6.3f\t%6.3f\n',out);
fprintf(fid,'\n');

%sig2 stuff
out=kdiag(k+1,:);
fprintf(fid,'Output table for sig2 \n\n');
fprintf(fid,'mean\t\tstd\t\ttp(>0)\t\ttnse\t\ttIEF\t\ttm*\t\tcd\n\n');
fprintf(fid,'%6.3f\t%6.3f\t%6.3f\t%6.3f\t%6.3f\t%6.3f\t%6.3f\n',out);
fprintf(fid,'\n');

save c:\klaus\AAEC6564\mlab\worksp
\mod2blocking betalmat beta2mat beta3mat sig2mat ...
    X1 X2 X3 X y;

finish = toc/60;
fprintf(fid,'Time elapsed in minutes \n\n');
fprintf(fid,'%6.3f\n',finish);

st=fclose(fid);
if st==0;
    disp('File closed successfully');
else;

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    warning('Problem with closing file');  
end;
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