papercode

A simple panel unit-root test with smooth breaks in the presence of a multifactor error structure.

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new;

m =3;/*set the number of variables in the BCIPS */
N =150; /*set the length of the period*/
k =2;/*set the kappa frequence*/
kk =m-1;/*set the number of the additional variables*/
c =40;/*set the data from period c*/
f =200;/*set the final date*/
T=f-c+1;/*T*/

/*****************************************************************
Load the data
*****************************************************************/

D=215;/*Length of the preiod for your data*/
load y[D,N]=C:y.txt; /*load your raw data*/
load x[D,N]=C:x.txt; /*load your additional variables data*/
zbar=zeros(D,n);
zbar=(sumc(y')/N~sumc(x')/N);
dy=(y[2:D,.]-y[1:D-1,.]);
dx=x[2:D,.]-x[1:D-1,.];
dzbar=zeros(D-1,2);
dzbar=((sumc(dy')/N)~(sumc(dx')/N));
c10=seqa(1,0,T);
c11=zeros(T,1);
c12=zeros(T,1);
for q(1,T,1);
c11[q]=sin(2*pi*q*k/T);
c12[q]=cos(2*pi*q*k/T);
endfor;
c13=zbar[c:f,1:m];
c14=dzbar[(c+1):(f+1),1:m];
b=y[c:f,.];
y1=dy[(c+1):(f+1),.];


print"-------------------------p=1----------------------";/*the lag number of
the BCIPS*/
c15=dzbar[c:f,1:m];
c16=dy[c:f,.];
e=zeros(t,n);ee=zeros(n,1);t1_rho=zeros(n,1);ssr=zeros(n,1);
for i(1,n,1);
X1=c10~c11~c12~c13~c14~c15~c16[.,i]~b[.,i];
e[.,i]=y1[.,i]-X1*inv(X1'*X1)*X1'*Y1[.,i];
ee[i,.]=sumc(e[.,i]^2);
ssr[i,1]=(X1*inv(X1'*X1)*X1'*Y1[.,i])'*(eye(t)-(1/t)*ones(t,t))*(X1*inv(X1'*X1)*
X1'*Y1[.,i]);
z1_rho=c16[.,i]~c15~c14~c10~c11~c12~c13;
Mz1_rho=eye(T)-z1_rho*inv(z1_rho'*z1_rho)*z1_rho';
G1_rho=z1_rho~b[.,i];
M1z_rho=eye(t)-G1_rho*inv(G1_rho'*G1_rho)*G1_rho';
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sigma1_hat=y1[.,i]'*M1z_rho*y1[.,i]/(T-(3*kk+6));
t1_rho[i,1]=(y1[.,i]'*Mz1_rho*b[.,i])/(sqrt(sigma1_hat)*sqrt(b[.,i]'*Mz1_rho*b[.
,i]));
endfor;
t1_rho;/*t statistic*/
SBC=(-t*n/2)*(1+ln(2*pi))-(t/2)*sumc(ln(ee/t));
print"SBC(p=1)=" SBC;
print "SSR=" sumc(ssr);
print "BCIPS=" sumc(t1_rho)/n;
print "==========================================================";
for i(1,n,1);
X1=c10~c13~c14~c15~c16[.,i]~b[.,i];
z1_rho=c16[.,i]~c15~c14~c10~c13;
Mz1_rho=eye(T)-z1_rho*inv(z1_rho'*z1_rho)*z1_rho';
G1_rho=z1_rho~b[.,i];
M1z_rho=eye(t)-G1_rho*inv(G1_rho'*G1_rho)*G1_rho';
sigma1_hat=y1[.,i]'*M1z_rho*y1[.,i]/(T-(3*kk+6));
t1_rho[i,1]=(y1[.,i]'*Mz1_rho*b[.,i])/(sqrt(sigma1_hat)*sqrt(b[.,i]'*Mz1_rho*b[.
,i]));
endfor;
print "CIPS=" sumc(t1_rho)/n;


print"--------------------------p=2----------------------";
c15=dzbar[c:f,1:m]~dzbar[(c-1):(f-1),1:m];
c16=dy[c:f,.]~dy[(c-1):(f-1),.];
e=zeros(t,n);ee=zeros(n,1);t1_rho=zeros(n,1);ssr=zeros(n,1);
for i(1,n,1);
X1=c10~c11~c12~c13~c14~c15~c16[.,i]~b[.,i];
e[.,i]=y1[.,i]-X1*inv(X1'*X1)*X1'*Y1[.,i];
ee[i,.]=sumc(e[.,i]^2);
ssr[i,1]=(X1*inv(X1'*X1)*X1'*Y1[.,i])'*(eye(t)-(1/t)*ones(t,t))*(X1*inv(X1'*X1)*
X1'*Y1[.,i]);
z1_rho=c16[.,i]~c15~c14~c10~c11~c12~c13;
Mz1_rho=eye(T)-z1_rho*inv(z1_rho'*z1_rho)*z1_rho';
G1_rho=z1_rho~b[.,i];
M1z_rho=eye(t)-G1_rho*inv(G1_rho'*G1_rho)*G1_rho';
sigma1_hat=y1[.,i]'*M1z_rho*y1[.,i]/(T-(3*kk+6));
t1_rho[i,1]=(y1[.,i]'*Mz1_rho*b[.,i])/(sqrt(sigma1_hat)*sqrt(b[.,i]'*Mz1_rho*b[.
,i]));
endfor;
SBC=(-t*n/2)*(1+ln(2*pi))-(t/2)*sumc(ln(ee/t));
print"SBC(p=2)=" SBC;
print "SSR=" sumc(ssr);
print "BCIPS=" sumc(t1_rho)/n;
for i(1,n,1);
X1=c10~c13~c14~c15~c16[.,i]~b[.,i];
z1_rho=c16[.,i]~c15~c14~c10~c13;
Mz1_rho=eye(T)-z1_rho*inv(z1_rho'*z1_rho)*z1_rho';
G1_rho=z1_rho~b[.,i];
M1z_rho=eye(t)-G1_rho*inv(G1_rho'*G1_rho)*G1_rho';
sigma1_hat=y1[.,i]'*M1z_rho*y1[.,i]/(T-(3*kk+6));
t1_rho[i,1]=(y1[.,i]'*Mz1_rho*b[.,i])/(sqrt(sigma1_hat)*sqrt(b[.,i]'*Mz1_rho*b[.
,i]));
endfor;
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print "CIPS=" sumc(t1_rho)/n;

print"-------------------------p=3----------------------";
c15=dzbar[c:f,1:m]~dzbar[(c-1):(f-1),1:m]~dzbar[(c-2):(f-2),1:m];
c16=dy[c:f,.]~dy[(c-1):(f-1),.]~dy[(c-2):(f-2),.];
e=zeros(t,n);ee=zeros(n,1);t1_rho=zeros(n,1);ssr=zeros(n,1);
for i(1,n,1);
X1=c10~c11~c12~c13~c14~c15~c16[.,i]~b[.,i];
e[.,i]=y1[.,i]-X1*inv(X1'*X1)*X1'*Y1[.,i];
ee[i,.]=sumc(e[.,i]^2);
ssr[i,1]=(X1*inv(X1'*X1)*X1'*Y1[.,i])'*(eye(t)-(1/t)*ones(t,t))*(X1*inv(X1'*X1)*
X1'*Y1[.,i]);
z1_rho=c16[.,i]~c15~c14~c10~c11~c12~c13;
Mz1_rho=eye(T)-z1_rho*inv(z1_rho'*z1_rho)*z1_rho';
G1_rho=z1_rho~b[.,i];
M1z_rho=eye(t)-G1_rho*inv(G1_rho'*G1_rho)*G1_rho';
sigma1_hat=y1[.,i]'*M1z_rho*y1[.,i]/(T-(3*kk+6));
t1_rho[i,1]=(y1[.,i]'*Mz1_rho*b[.,i])/(sqrt(sigma1_hat)*sqrt(b[.,i]'*Mz1_rho*b[.
,i]));
endfor;
SBC=(-t*n/2)*(1+ln(2*pi))-(t/2)*sumc(ln(ee/t));
print"SBC(p=3)=" SBC;
print "SSR=" sumc(ssr);
print "BCIPS=" sumc(t1_rho)/n;
for i(1,n,1);
X1=c10~c13~c14~c15~c16[.,i]~b[.,i];
z1_rho=c16[.,i]~c15~c14~c10~c13;
Mz1_rho=eye(T)-z1_rho*inv(z1_rho'*z1_rho)*z1_rho';
G1_rho=z1_rho~b[.,i];
M1z_rho=eye(t)-G1_rho*inv(G1_rho'*G1_rho)*G1_rho';
sigma1_hat=y1[.,i]'*M1z_rho*y1[.,i]/(T-(3*kk+6));
t1_rho[i,1]=(y1[.,i]'*Mz1_rho*b[.,i])/(sqrt(sigma1_hat)*sqrt(b[.,i]'*Mz1_rho*b[.
,i]));
endfor;
print "CIPS=" sumc(t1_rho)/n;

print"-------------------------p=4----------------------";
c15=dzbar[c:f,1:m]~dzbar[(c-1):(f-1),1:m]~dzbar[(c-2):(f-2),1:m]~dzbar[(c-3):(f-
3),1:m];
c16=dy[c:f,.]~dy[(c-1):(f-1),.]~dy[(c-2):(f-2),.]~dy[(c-3):(f-3),.];
e=zeros(t,n);ee=zeros(n,1);t1_rho=zeros(n,1);ssr=zeros(n,1);
for i(1,n,1);
X1=c10~c11~c12~c13~c14~c15~c16[.,i]~b[.,i];
e[.,i]=y1[.,i]-X1*inv(X1'*X1)*X1'*Y1[.,i];
ee[i,.]=sumc(e[.,i]^2);
ssr[i,1]=(X1*inv(X1'*X1)*X1'*Y1[.,i])'*(eye(t)-(1/t)*ones(t,t))*(X1*inv(X1'*X1)*
X1'*Y1[.,i]);
z1_rho=c16[.,i]~c15~c14~c10~c11~c12~c13;
Mz1_rho=eye(T)-z1_rho*inv(z1_rho'*z1_rho)*z1_rho';
G1_rho=z1_rho~b[.,i];
M1z_rho=eye(t)-G1_rho*inv(G1_rho'*G1_rho)*G1_rho';
sigma1_hat=y1[.,i]'*M1z_rho*y1[.,i]/(T-(3*kk+6));
t1_rho[i,1]=(y1[.,i]'*Mz1_rho*b[.,i])/(sqrt(sigma1_hat)*sqrt(b[.,i]'*Mz1_rho*b[.
,i]));
endfor;
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SBC=(-t*n/2)*(1+ln(2*pi))-(t/2)*sumc(ln(ee/t));
print"SBC(p=4)=" SBC;
print "SSR=" sumc(ssr);
print "BCIPS=" sumc(t1_rho)/n;
for i(1,n,1);
X1=c10~c13~c14~c15~c16[.,i]~b[.,i];
z1_rho=c16[.,i]~c15~c14~c10~c13;
Mz1_rho=eye(T)-z1_rho*inv(z1_rho'*z1_rho)*z1_rho';
G1_rho=z1_rho~b[.,i];
M1z_rho=eye(t)-G1_rho*inv(G1_rho'*G1_rho)*G1_rho';
sigma1_hat=y1[.,i]'*M1z_rho*y1[.,i]/(T-(3*kk+6));
t1_rho[i,1]=(y1[.,i]'*Mz1_rho*b[.,i])/(sqrt(sigma1_hat)*sqrt(b[.,i]'*Mz1_rho*b[.
,i]));
endfor;
print "CIPS=" sumc(t1_rho)/n;
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