

[5] Panel Data Programs for the Hausman-Taylor Model

Program: pan_ht.prg

```
/*
**          PROGRAM FOR HT ESTIMATION OF PANEL DATA
**
**          WRITTEN BY
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**
*/

/*
** Computing HT, AM and BMS Estimators
** With Hausman Tests
*/

new ;

@ Put MGIV.COL in the directory you execute this program! @

#include mgiv.col ;

@ Open Output file @

output file = pan_ht.out reset ;

@ Format output file @

format /rd 12,4 ;

@ Provide # of observations and # of variables @

nobs = 4165 ;
nvar = 23 ;

@ Read Data @

load dat[nobs,nvar] = cr.db ;
@ dat = delif(dat,dat[.,10] .== 1) ; @

@ Define Variables @

id68 = dat[.,1] ;
expp = dat[.,2] ;
expp2 = dat[.,3] ;
wks = dat[.,4] ;
occ = dat[.,5] ;
ind = dat[.,6] ;
south = dat[.,7] ;
smsa = dat[.,8] ;
ms = dat[.,9] ;
fem = dat[.,10] ;
unionm = dat[.,11] ;
edu = dat[.,12] ;
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blk    = dat[:,13] ;
wage   = dat[:,14] ;
y76    = dat[:,17] ;
y77    = dat[:,18] ;
y78    = dat[:,19] ;
y79    = dat[:,20] ;
y80    = dat[:,21] ;
y81    = dat[:,22] ;
y82    = dat[:,23] ;
lwage  = ln(wage)  ;
lwks   = ln(wks)   ;
dyr    = y77~y78~y79~y80~y81~y82 ;

@ Define N and T @

n      = 4165/7 ;
@      n      = 528      ; @
t      = 7      ;

@ Define Dep. Var., Time-varying Reg. and Time-invariant Reg. @

@ Treating expp as time-invariant @
rexp = {0,1,2,3,4,5,6} ;
rexp = ones(n,1) .* rexp ;
rexp = expp - rexp ;

yy    = lwage ;
xx    = wks~south~smsa~ms~(expp^2)~occ~ind~unionm~dyr ;
zz    = ones(n*t,1)~fem~blk~edu~rexp ;
xx1   = wks~south~smsa~ms ;
zz1   = ones(n*t,1)~fem~blk ;

vny   = {"logwage"};
vnx   = {"wks", "south", "smsa", "ms", "expp2", "occ", "ind", "unionm",
        "yr77", "yr78", "yr79", "yr80", "yr81", "yr82"};
vnz   = {"cons", "fem", "blk", "edu", "exp"};

/*
** From Here, Do Not Change
*/

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Output file: pan_ht.out

Within Estimation Result

dependent variable: logwage

variable	coeff.	std. err.	t-st
wks	0.0007	0.0006	1.1362
south	0.0031	0.0342	0.0903
smsa	-0.0419	0.0194	-2.1618
ms	-0.0286	0.0189	-1.5100
expp2	-0.0004	0.0001	-7.3267
occ	-0.0192	0.0137	-1.3938
ind	0.0208	0.0154	1.3478
unionm	0.0295	0.0149	1.9836
yr77	0.1037	0.0090	11.5199
yr78	0.2485	0.0096	25.7857
yr79	0.3628	0.0107	33.9489
yr80	0.4700	0.0121	38.9211
yr81	0.5646	0.0138	41.0263
yr82	0.6687	0.0157	42.5741

Hausman_Taylor Estimation Result

dependent variable: logwage

variable	coeff.	std. err.	t-st
wks	0.0008	0.0006	1.3294
south	0.0118	0.0293	0.4047
smsa	-0.0393	0.0193	-2.0372
ms	-0.0258	0.0189	-1.3671
expp2	-0.0004	0.0001	-7.3517
occ	-0.0192	0.0137	-1.3953
ind	0.0211	0.0154	1.3720
unionm	0.0267	0.0148	1.8020
yr77	0.1036	0.0090	11.5110
yr78	0.2486	0.0096	25.8039
yr79	0.3630	0.0107	33.9649
yr80	0.4702	0.0121	38.9392
yr81	0.5649	0.0138	41.0510
yr82	0.6691	0.0157	42.6031
cons	3.0065	0.5018	5.9910
fem	-0.4041	0.0793	-5.0924
blk	0.0159	0.1068	0.1487
edu	0.2236	0.0404	5.5410
exp	0.0416	0.0108	3.8418

THETA = 0.1127
SIGE2 = 0.0229
SIGAA = 0.2545

HAUSMAN TEST FOR HT VS. WITHIN
STATISTIC, P-VAL, DF = 4.7414 0.0934 2.0000

HANSEN TEST FOR HT
STATISTIC, P-VAL, DF = 4.7526 0.0929 2.0000

AM Estimation Result

dependent variable: logwage

variable	coeff.	std. err.	t-st
wks	0.0008	0.0006	1.2980
south	-0.0074	0.0286	-0.2602
smsa	-0.0249	0.0186	-1.3371
ms	-0.0266	0.0186	-1.4288
expp2	-0.0004	0.0001	-7.3988
occ	-0.0204	0.0137	-1.4867
ind	0.0214	0.0154	1.3905
unionm	0.0287	0.0148	1.9418
yr77	0.1036	0.0090	11.5120
yr78	0.2487	0.0096	25.8230
yr79	0.3633	0.0107	34.0114
yr80	0.4703	0.0121	38.9861
yr81	0.5654	0.0137	41.1268
yr82	0.6698	0.0157	42.6947
cons	3.9719	0.3778	10.5129
fem	-0.4052	0.0737	-5.4948
blk	-0.0657	0.0920	-0.7133
edu	0.1540	0.0273	5.6497
exp	0.0376	0.0076	4.9480

HAUSMAN TEST FOR AM VS. WITHIN
Statistic, p-val, df = 17.2340 0.0278 8.0000

HAUSMAN TEST FOR AM VS. HT
Statistic, p-val, df = 12.4926 0.0518 6.0000

HANSEN TEST FOR AM
STATISTIC, P-VAL, DF = 25.3809 0.4975 26.0000

EHS TEST FOR AM VS. HT
STATISTIC, P-VAL, DF = 20.6283 0.6605 24.0000

Program: pan_mgiv.prg

```
/*
**          PROGRAM FOR MGIV ESTIMATION OF PANEL DATA
**
**          WRITTEN BY
**          SEUNG CHAN AHN
**          DEPARTMENT OF ECONOMICS
**          COLLEGE OF BUSINESS
**          TEMPE, AZ 85287
**
*/

/*
** COMPUTING MGIV and GMM FOR HT, AM AND BMS ESTIMATOR
** COMPUTING GMM USING HT and AM INSTRUMENTS
** HAUSMAN TESTS
** HANSEN TESTS
**   EHS TESTS
**
*/

new ;

@   Locate MGIV.COL in the directory you execute this program @

#include mgiv.col ;

@   Open output file @

output file = pan_mgiv.out reset ;

@   Format output file @

format /rd 12,4 ;

@   Provide # of observations and # of variables @

nobs = 4165 ;
tim   = 7   ;
nvar  = 23  ;

@   Read Data   @

load dat[nobs,nvar] = cr.db ;
@ dat = delif(dat,dat[.,10] .== 1) ; @

@   Define Variables @

id68  = dat[.,1] ;
expp  = dat[.,2] ;
expp2 = dat[.,3] ;
wks   = dat[.,4] ;
occ   = dat[.,5] ;
ind   = dat[.,6] ;
south = dat[.,7] ;
smsa  = dat[.,8] ;
ms    = dat[.,9] ;
fem   = dat[.,10] ;
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unionm= dat[:,11] ;
edu    = dat[:,12] ;
blk    = dat[:,13] ;
wage   = dat[:,14] ;
UNKNOWN = dat[:,15] ;
UNKNOWN2 = dat[:,16] ;
y76    = dat[:,17] ;
y77    = dat[:,18] ;
y78    = dat[:,19] ;
y79    = dat[:,20] ;
y80    = dat[:,21] ;
y81    = dat[:,22] ;
y82    = dat[:,23] ;
lwage  = ln(wage) ;
lwks   = ln(wks) ;
dyr    = y77~y78~y79~y80~y81~y82 ;

```

```
@ Define N and T @
```

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n = rows(dat)/tim ;
t = tim ;

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```
@ Define Dep. Var., Time-varying Reg. and Time-invariant Reg. @
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@ Treating expp as time-invariant @
rexp = {0,1,2,3,4,5,6} ;
rexp = ones(n,1) .* rexp ;
rexp = expp - rexp ;

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```

yy = lwage ;
xx = wks~south~smsa~ms~(expp^2)~occ~ind~unionm~dyr ;
zz = ones(n*t,1)~fem~blk~edu~rexp ;
xx1 = wks~south~smsa~ms ;
zz1 = ones(n*t,1)~fem~blk ;

```

```

vny = {"logwage"};
vnx = {"wks", "south", "smsa", "ms", "expp2", "occ", "ind", "unionm",
      "yr77", "yr78", "yr79", "yr80", "yr81", "yr82"};
vnz = {"cons", "fem", "blk", "edu", "exp"};

```

```

/*
** From Here, Do Not Change
*/

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Program: pan_mgiv.prg

Kiefer's Within Estimation Results

dependent variable: logwage

variable	coeff.	std. err.	t-st
wks	0.0006	0.0005	1.1759
south	0.0119	0.0376	0.3153
smsa	-0.0347	0.0201	-1.7231
ms	-0.0339	0.0196	-1.7276
expp2	-0.0005	0.0001	-5.7818
occ	-0.0158	0.0126	-1.2561
ind	0.0262	0.0146	1.7931
unionm	0.0101	0.0140	0.7226
yr77	0.1052	0.0060	17.6375
yr78	0.2525	0.0108	23.2896
yr79	0.3691	0.0128	28.7942
yr80	0.4782	0.0148	32.2853
yr81	0.5752	0.0181	31.7280
yr82	0.6815	0.0214	31.8219

Kiefer's Within Estimation Results (HETERO ADJUSTED)

dependent variable: logwage

variable	coeff.	std. err.	t-st
wks	0.0006	0.0007	0.8973
south	0.0119	0.0734	0.1617
smsa	-0.0347	0.0285	-1.2168
ms	-0.0339	0.0216	-1.5648
expp2	-0.0005	0.0001	-5.5759
occ	-0.0158	0.0174	-0.9073
ind	0.0262	0.0188	1.3933
unionm	0.0101	0.0189	0.5354
yr77	0.1052	0.0063	16.6378
yr78	0.2525	0.0114	22.2325
yr79	0.3691	0.0134	27.5679
yr80	0.4782	0.0159	30.0244
yr81	0.5752	0.0205	28.0584
yr82	0.6815	0.0246	27.7005

Hausman-Taylor MGIV Estimation Result

 dependent variable: logwage

variable	coeff.	std. err.	t-st
wks	0.0007	0.0005	1.3865
south	0.0186	0.0306	0.6083
smsa	-0.0315	0.0203	-1.5504
ms	-0.0289	0.0197	-1.4658
expp2	-0.0005	0.0001	-5.7398
occ	-0.0163	0.0127	-1.2841
ind	0.0267	0.0147	1.8130
unionm	0.0063	0.0141	0.4448
yr77	0.1051	0.0060	17.3800
yr78	0.2527	0.0111	22.8415
yr79	0.3693	0.0130	28.4359
yr80	0.4784	0.0150	31.9356
yr81	0.5755	0.0184	31.3390
yr82	0.6819	0.0216	31.5173
cons	3.0190	0.4739	6.3709
fem	-0.4040	0.0719	-5.6209
blk	0.0149	0.0975	0.1531
edu	0.2208	0.0379	5.8243
exp	0.0444	0.0101	4.3735

Hausman-Taylor Estimation Result (HETERO ADJUSTED)

 dependent variable: logwage

variable	coeff.	std. err.	t-st
wks	0.0007	0.0007	1.0786
south	0.0186	0.0515	0.3618
smsa	-0.0315	0.0283	-1.1107
ms	-0.0289	0.0216	-1.3364
expp2	-0.0005	0.0001	-5.5938
occ	-0.0163	0.0174	-0.9359
ind	0.0267	0.0189	1.4155
unionm	0.0063	0.0189	0.3318
yr77	0.1051	0.0063	16.6317
yr78	0.2527	0.0113	22.3048
yr79	0.3693	0.0133	27.6746
yr80	0.4784	0.0159	30.1072
yr81	0.5755	0.0204	28.1598
yr82	0.6819	0.0246	27.7402
cons	3.0190	0.6037	5.0006
fem	-0.4040	0.0690	-5.8535
blk	0.0149	0.1078	0.1385
edu	0.2208	0.0461	4.7921
exp	0.0444	0.0112	3.9636

Hausman Test for HT MGIV VS. Within MGIV
stat, p-val, df = 4.6282 0.0989 2.0000

Hausman-Taylor GMM Estimation Result

dependent variable: logwage

variable	coeff.	std. err.	t-st
wks	0.0008	0.0009	0.9135
south	0.0241	0.0445	0.5416
smsa	-0.0332	0.0302	-1.1013
ms	-0.0218	0.0291	-0.7478
expp2	-0.0004	0.0001	-5.1422
occ	-0.0191	0.0177	-1.0789
ind	0.0218	0.0227	0.9607
unionm	0.0201	0.0249	0.8071
yr77	0.1040	0.0065	16.0646
yr78	0.2491	0.0113	22.0548
yr79	0.3647	0.0133	27.3864
yr80	0.4732	0.0155	30.4754
yr81	0.5689	0.0197	28.8235
yr82	0.6742	0.0238	28.3113
cons	2.9538	0.5630	5.2462
fem	-0.3990	0.0614	-6.4996
blk	-0.0094	0.0992	-0.0951
edu	0.2232	0.0435	5.1283
exp	0.0451	0.0106	4.2569

Hansen Test for HT
stat, p-val, df = 4.3420 0.1141 2.0000

Amemiya-MaCurdy Estimation Result

 dependent variable: logwage

variable	coeff.	std. err.	t-st
wks	0.0006	0.0005	1.2587
south	-0.0269	0.0219	-1.2306
smsa	0.0204	0.0180	1.1347
ms	-0.0202	0.0189	-1.0699
expp2	-0.0005	0.0001	-6.0422
occ	-0.0202	0.0128	-1.5793
ind	0.0289	0.0149	1.9418
unionm	0.0092	0.0141	0.6514
yr77	0.1059	0.0061	17.2932
yr78	0.2550	0.0112	22.7436
yr79	0.3730	0.0132	28.3007
yr80	0.4825	0.0152	31.8216
yr81	0.5816	0.0186	31.2796
yr82	0.6897	0.0219	31.4721
cons	4.2978	0.2219	19.3715
fem	-0.3906	0.0392	-9.9681
blk	-0.0574	0.0477	-1.2032
edu	0.1301	0.0158	8.2119
exp	0.0370	0.0049	7.5178

Amemiya-MaCurdy Estimation Result (HETERO ADJUSTED)

 dependent variable: logwage

variable	coeff.	std. err.	t-st
wks	0.0006	0.0007	0.9659
south	-0.0269	0.0327	-0.8220
smsa	0.0204	0.0237	0.8628
ms	-0.0202	0.0220	-0.9161
expp2	-0.0005	0.0001	-5.9049
occ	-0.0202	0.0174	-1.1606
ind	0.0289	0.0185	1.5583
unionm	0.0092	0.0187	0.4898
yr77	0.1059	0.0063	16.6892
yr78	0.2550	0.0114	22.3107
yr79	0.3730	0.0135	27.5836
yr80	0.4825	0.0161	29.9487
yr81	0.5816	0.0206	28.2932
yr82	0.6897	0.0248	27.8335
cons	4.2978	0.2891	14.8649
fem	-0.3906	0.0433	-9.0182
blk	-0.0574	0.0587	-0.9792
edu	0.1301	0.0202	6.4579
exp	0.0370	0.0057	6.4654

Hausman Test for AM MGIV VS. Within MGIV
stat, p-val, df = 42.1182 0.0000 8.0000

Amemiya-MaCurdy GMM Estimation Result

dependent variable: logwage

variable	coeff.	std. err.	t-st
wks	0.0012	0.0009	1.4357
south	-0.0483	0.0263	-1.8385
smsa	0.1150	0.0246	4.6767
ms	0.0115	0.0303	0.3813
expp2	-0.0005	0.0001	-5.8212
occ	-0.0173	0.0166	-1.0410
ind	0.0206	0.0213	0.9677
unionm	0.0286	0.0215	1.3282
yr77	0.1040	0.0063	16.4659
yr78	0.2426	0.0111	21.8568
yr79	0.3629	0.0131	27.5978
yr80	0.4688	0.0152	30.8802
yr81	0.5711	0.0189	30.1783
yr82	0.6757	0.0228	29.5733
cons	4.7568	0.2185	21.7731
fem	-0.3946	0.0392	-10.054
blk	-0.1448	0.0431	-3.3623
edu	0.0897	0.0129	6.9436
exp	0.0340	0.0049	6.9472

Hansen Test for AM
stat, p-val, df = 49.8631 0.0033 26.0000

EHS Test
stat, p-val, df = 45.5211 0.0051 24.0000