

**HAUSMAN AND TAYLOR**

```

. /** Ler os dados **/
.
. use wagepan, clear
.
. tsset nr year, yearly
    panel variable:  nr (strongly balanced)
    time variable:   year, 1980 to 1987
                    delta: 1 year

. xtdescribe

    nr: 13, 17, ..., 12548                n =          545
    year: 1980, 1981, ..., 1987          T =           8
    Delta(year) = 1 year
    Span(year) = 8 periods
    (nr*year uniquely identifies each observation)

Distribution of T_i:   min      5%      25%      50%      75%      95%      max
                    8         8        8         8         8         8         8

-----+-----
Freq.  Percent  Cum. | Pattern
-----+-----
  545   100.00  100.00 | 11111111
-----+-----
  545   100.00      | XXXXXXXXX

. /** Pooled OLS com DPs robustos **/
.
.
. xi: reg lwage i.year educ black hisp exper expersq married union, rob cluster(nr)
i.year          _Iyear_1980-1987      (naturally coded; _Iyear_1980 omitted)

Linear regression                                         Number of obs =    4360
                                                         F( 14, 544) =    47.10
                                                         Prob > F      =    0.0000
                                                         R-squared     =    0.1893
                                                         Root MSE     =    .48033

                                                         (Std. Err. adjusted for 545 clusters in nr)

-----+-----
          |          Robust
lwage |          Coef.  Std. Err.      t    P>|t|      [95% Conf. Interval]
-----+-----
_Iyear_1981 |          .05832   .028228      2.07  0.039   .0028707   .1137693
_Iyear_1982 |          .0627744 .0369735     1.70  0.090  -.0098538   .1354027
_Iyear_1983 |          .0620117 .046248     1.34  0.181  -.0288348   .1528583
_Iyear_1984 |          .0904672 .057988     1.56  0.119  -.0234407   .204375
_Iyear_1985 |          .1092463 .0668474     1.63  0.103  -.0220644   .2405569
_Iyear_1986 |          .1419595 .0762348     1.86  0.063  -.0077911   .2917102
_Iyear_1987 |          .1738334 .0852056     2.04  0.042   .0064611   .3412057
    educ |          .0913498 .0110822     8.24  0.000   .0695807   .1131189
    black |         -.1392342   .0505238    -2.76  0.006  -.2384798  -.0399887
    hisp  |          .0160195 .0390781     0.41  0.682  -.060743   .092782
    exper |          .0672345 .0195958     3.43  0.001   .0287417   .1057273
    expersq |         -.0024117   .0010252    -2.35  0.019  -.0044255  -.0003979
    married |          .108253   .026034     4.16  0.000   .0571135   .1593924
    union |          .1824613 .0274435     6.65  0.000   .1285531   .2363694
    _cons |          .0920558 .1609365     0.57  0.568  -.2240772   .4081889
-----+-----

```

```
. . /** Hausman e Taylor naif **/
```

```
. . /** 1° Passo: Fixed Effects **/
```

```
. xi: xtreg lwage i.year exper expersq married union, fe rob cluster(nr)
```

```
i.year          _Iyear_1980-1987      (naturally coded; _Iyear_1980 omitted)  
note: _Iyear_1987 omitted because of collinearity
```

```
Fixed-effects (within) regression      Number of obs      =      4360  
Group variable: nr                    Number of groups   =      545
```

```
R-sq:  within = 0.1806                Obs per group: min =      8  
        between = 0.0005                avg =      8.0  
        overall = 0.0635                max =      8
```

```
corr(u_i, Xb) = -0.1212                F(10,544)          =      46.59  
                                                Prob > F            =      0.0000
```

(Std. Err. adjusted for 545 clusters in nr)

	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
_Iyear_1981	.0190448	.0227267	0.84	0.402	-.025598	.0636876
_Iyear_1982	-.011322	.0212167	-0.53	0.594	-.0529986	.0303547
_Iyear_1983	-.0419955	.0205087	-2.05	0.041	-.0822814	-.0017096
_Iyear_1984	-.0384709	.0211722	-1.82	0.070	-.0800601	.0031183
_Iyear_1985	-.0432498	.017595	-2.46	0.014	-.0778122	-.0086875
_Iyear_1986	-.027382	.0162181	-1.69	0.092	-.0592396	.0044757
_Iyear_1987	(omitted)					
exper	.1321464	.012008	11.00	0.000	.1085586	.1557342
expersq	-.0051855	.0008102	-6.40	0.000	-.0067771	-.0035939
married	.0466804	.0210038	2.22	0.027	.0054218	.0879389
union	.0800019	.0227431	3.52	0.000	.0353268	.1246769
_cons	1.02764	.0398919	25.76	0.000	.9492785	1.106001
sigma_u	.40092789					
sigma_e	.35099001					
rho	.56612235					(fraction of variance due to u_i)

```
. /** Estimativa dos Fixed Effects **/
```

```
. predict muallhat, u
```

. \*\* 2° Passo

. ivreg muallhat black hisp (educ = exper expersq married), robust cluster(nr)

Instrumental variables (2SLS) regression

Number of obs =	4360
F( 3, 544) =	23.14
Prob > F =	0.0000
R-squared =	0.2099
Root MSE =	.35621

(Std. Err. adjusted for 545 clusters in nr)

muallhat	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
educ	.115802	.0161472	7.17	0.000	.0840836	.1475205
black	-.1398007	.0504346	-2.77	0.006	-.2388711	-.0407304
hisp	.0361657	.0424399	0.85	0.394	-.0472005	.119532
_cons	-1.352119	.1946675	-6.95	0.000	-1.734511	-.9697272

Instrumented: educ  
Instruments: black hisp exper expersq married

. . /\*\* Hausman e Taylor \*\*/

xthtaylor fits panel-data random-effects models in which some of the covariates are correlated with the unobserved individual-level random effect. The estimators, originally proposed by Hausman & Taylor (1981) and Amemiya & MaCurdy (1986), are based on instrumental variables. By default, xthtaylor uses the Hausman-Taylor estimator.

When the amacurdy option is specified, xthtaylor uses the Amemiya-MaCurdy estimator.

. xi: xthtaylor lwage i.year educ black hisp exper expersq married union,  
endog(educ union) vce(bootstrap)  
i.year \_Iyear\_1980-1987 (naturally coded; \_Iyear\_1980 omitted)  
(running xthtaylor on estimation sample)

Bootstrap replications (50)

-----+----- 1 -----+----- 2 -----+----- 3 -----+----- 4 -----+----- 5  
..... 50

Hausman-Taylor estimation	Number of obs =	4360
Group variable: nr	Number of groups =	545
	Obs per group: min =	8
	avg =	8
	max =	8

Random effects u_i ~ i.i.d.	Wald chi2(14) =	1232.60
	Prob > chi2 =	0.0000

	Observed Coef.	Bootstrap Std. Err.	z	P> z	Normal-based [95% Conf. Interval]	
TVexogenous						
_Iyear_1981	.0634239	.0432968	1.46	0.143	-.0214362	.148284
_Iyear_1982	.0775172	.0795371	0.97	0.330	-.0783726	.233407

_Iyear_1983		.0902714	.1140935	0.79	0.429	-.1333477	.3138905
_Iyear_1984		.1373866	.1515229	0.91	0.365	-.1595928	.434366
_Iyear_1985		.1758279	.1866888	0.94	0.346	-.1900754	.5417312
_Iyear_1986		.2344393	.222742	1.05	0.293	-.2021271	.6710056
_Iyear_1987		.3039455	.2575128	1.18	0.238	-.2007703	.8086612
exper		.0835456	.0348493	2.40	0.017	.0152423	.151849
expersq		-.0048841	.0008459	-5.77	0.000	-.006542	-.0032262
married		.0671315	.0217103	3.09	0.002	.02458	.1096829
TVendogenous							
union		.0790891	.0228979	3.45	0.001	.03421	.1239682
TIexogenous							
black		-.1381919	.0539008	-2.56	0.010	-.2438356	-.0325483
hisp		-.0038351	.0509283	-0.08	0.940	-.1036528	.0959826
TIendogenous							
educ		.0501754	.0552668	0.91	0.364	-.0581456	.1584964
_cons		.5931912	.7509531	0.79	0.430	-.8786498	2.065032
-----							
sigma_u		.33482192					
sigma_e		.3505297					
rho		.47709273	(fraction of variance due to u_i)				

Note: TV refers to time varying; TI refers to time invariant.

. xi: xthtaylor lwage i.year educ black hisp exper expersq married union,  
endog(educ) vce(bootstrap)

Hausman-Taylor estimation	Number of obs	=	4360
Group variable: nr	Number of groups	=	545
	Obs per group: min	=	8
	avg	=	8
	max	=	8
Random effects u_i ~ i.i.d.	Wald chi2(14)	=	552.80
	Prob > chi2	=	0.0000

	Observed	Bootstrap			Normal-based	
lwage	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
TVexogenous						
_Iyear_1981	.0697079	.0406498	1.71	0.086	-.0099642	.1493801
_Iyear_1982	.0898168	.0763663	1.18	0.240	-.0598583	.239492
_Iyear_1983	.1090567	.1121262	0.97	0.331	-.1107066	.3288199
_Iyear_1984	.1621931	.1474893	1.10	0.271	-.1268805	.4512667
_Iyear_1985	.2075129	.186722	1.11	0.266	-.1584555	.5734812
_Iyear_1986	.2725906	.2243028	1.22	0.224	-.1670349	.712216
_Iyear_1987	.3468331	.2596779	1.34	0.182	-.1621262	.8557924
exper	.0772491	.0382708	2.02	0.044	.0022396	.1522585
expersq	-.0048738	.0008483	-5.75	0.000	-.0065363	-.0032112
married	.0670213	.0201422	3.33	0.001	.0275433	.1064993
union	.1057129	.0225663	4.68	0.000	.0614838	.1499419
TIexogenous						
black	-.1430492	.0598373	-2.39	0.017	-.2603281	-.0257704
hisp	-.0118281	.0652365	-0.18	0.856	-.1396894	.1160331
TIendogenous						
educ	.0401203	.066162	0.61	0.544	-.0895548	.1697953
_cons	.725506	.9028813	0.80	0.422	-1.044109	2.495121
-----						
sigma_u	.3349574					
sigma_e	.3505297					
rho	.47729459	(fraction of variance due to u_i)				

-----Note:  
TV refers to time varying; TI refers to time invariant.