Modelos de Datos de Panel

Ejemplo # 1

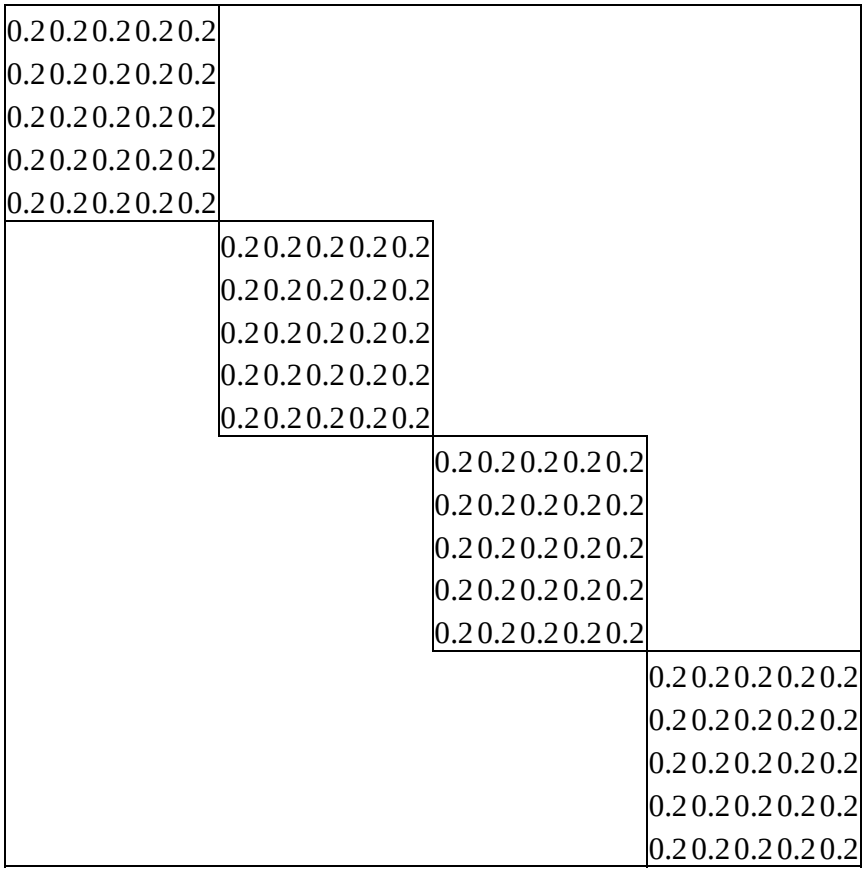
La tabla que se presenta a continuación contiene información hipotética de dos variables, Y, X , para cuatro empresas durante cinco años.

Obs.	*Y*	*X*	*PX*	*QX*
F1-1	94.9599	58.6996	54.3436	4.356
F1-2	90.9597	64.17575	54.3436	9.8322
F1-3	59.67644	1.80787	54.3436	-52.5357
F1-4	81.99586	84.95044	54.3436	30.6069
F1-5	4.49594	62.08417	54.3436	7.7406
F2-1	63.2618	48.631	43.6594	4.9716
F2-2	41.0125	41.28715	43.6594	-2.3723
F2-3	97.00632	13.05839	43.6594	-30.601
F2-4	85.22528	72.35931	43.6594	28.6999
F2-5	81.33018	42.96126	43.6594	-0.6982
F3-1	16.33637	49.88583	37.8371	12.0487
F3-2	65.45021	31.10691	37.8371	-6.7302
F3-3	21.72668	13.9128	37.8371	-23.9243
F3-4	60.3256	32.50799	37.8371	-5.3291
F3-5	92.39132	61.77211	37.8371	23.935
F4-1	20.97609	3.79121	48.7432	-44.952
F4-2	45.17865	18.87056	48.7432	-29.8726
F4-3	17.59114	57.51045	48.7432	8.7673
F4-4	54.37073	78.18084	48.7432	29.4376
F4-5	8.88924	85.36294	48.7432	36.6197

$Z_\mu = I_N \otimes \iota_T$

1	0	0	0
1	0	0	0
1	0	0	0
1	0	0	0
1	0	0	0
0	1	0	0
0	1	0	0
0	1	0	0
0	1	0	0
0	1	0	0
0	0	1	0
0	0	1	0
0	0	1	0
0	0	1	0
0	0	1	0
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1

$$P = Z_\mu \left(Z_\mu^{'} Z_\mu \right)^{-1} Z_\mu^{'}$$



$$Q = I_{NT} - P$$

$$\begin{bmatrix}
0.8 & -0.2 & -0.2 & -0.2 & -0.2 & & & & & & & & & & \\
-0.2 & 0.8 & -0.2 & -0.2 & -0.2 & & & & & & & & & & \\
-0.2 & -0.2 & 0.8 & -0.2 & -0.2 & & & & & & & & & & \\
-0.2 & -0.2 & -0.2 & 0.8 & -0.2 & & & & & & & & & & \\
-0.2 & -0.2 & -0.2 & -0.2 & 0.8 & & & & & & & & & & \\
 & & & & & 0.8 & -0.2 & -0.2 & -0.2 & -0.2 & & & & & \\
 & & & & & -0.2 & 0.8 & -0.2 & -0.2 & -0.2 & & & & & \\
 & & & & & -0.2 & -0.2 & 0.8 & -0.2 & -0.2 & & & & & \\
 & & & & & -0.2 & -0.2 & -0.2 & 0.8 & -0.2 & & & & & \\
 & & & & & -0.2 & -0.2 & -0.2 & -0.2 & 0.8 & & & & & \\
 & & & & & & & & & & 0.8 & -0.2 & -0.2 & -0.2 & -0.2 \\
 & & & & & & & & & & -0.2 & 0.8 & -0.2 & -0.2 & -0.2 \\
 & & & & & & & & & & -0.2 & -0.2 & 0.8 & -0.2 & -0.2 \\
 & & & & & & & & & & -0.2 & -0.2 & -0.2 & 0.8 & -0.2 \\
 & & & & & & & & & & -0.2 & -0.2 & -0.2 & -0.2 & 0.8
\end{bmatrix}$$

Ejemplo # 2

En este ejemplo se consideran los datos de Grunfeld (1958), también utilizado en Baltagi (2001). Se estima una ecuación de inversión (I_{it}) en función del acervo de capital al comienzo del período (C_{it}), y del valor de las acciones al comienzo del período (F_{it}), donde $i = 1,...,10$ firmas, $t = 1935,...,1954$ (i.e. 20 años).

Dependent Variable: I?
Method: Pooled Least Squares
Sample: 1935 1954
Included observations: 20
Cross-sections included: 10
Total pool (balanced) observations: 200

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-42.71437	9.511676	-4.490730	0.0000
F?	0.115562	0.005836	19.80259	0.0000
C?	0.230678	0.025476	9.054808	0.0000

R-squared	0.812408	Mean dependent var	145.9582
Adjusted R-squared	0.810504	S.D. dependent var	216.8753
S.E. of regression	94.40840	Akaike info criterion	11.94802
Sum squared resid	1755850.	Schwarz criterion	11.99750
Log likelihood	-1191.802	F-statistic	426.5757
Durbin-Watson stat	0.219599	Prob(F-statistic)	0.000000

Dependent Variable: I?
Method: Pooled Least Squares
Date: 06/10/04 Time: 12:04
Sample: 1935 1954
Included observations: 20
Cross-sections included: 10
Total pool (balanced) observations: 200

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-58.74394	12.45369	-4.716990	0.0000
F?	0.110124	0.011857	9.287901	0.0000
C?	0.310065	0.017355	17.86656	0.0000
Fixed Effects (Cross)				
01--C	-11.55278			
02--C	160.6498			
03--C	-176.8279			
04--C	30.93464			
05--C	-55.87287			
06--C	35.58264			
07--C	-7.809534			
08--C	1.198282			
09--C	-28.47833			
10--C	52.17610			

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.944073	Mean dependent var	145.9582
Adjusted R-squared	0.940800	S.D. dependent var	216.8753
S.E. of regression	52.76797	Akaike info criterion	10.82781
Sum squared resid	523478.1	Schwarz criterion	11.02571
Log likelihood	-1070.781	F-statistic	288.4996
Durbin-Watson stat	0.716733	Prob(F-statistic)	0.000000

Dependent Variable: I?
Method: Pooled Least Squares
Date: 06/10/04 Time: 12:06
Sample: 1935 1954
Included observations: 20
Cross-sections included: 10
Total pool (balanced) observations: 200

Variable	Coefficient	Std. Error	t-Statistic	Prob.
F?	0.110124	0.011857	9.287901	0.0000
C?	0.310065	0.017355	17.86656	0.0000
01--C	-70.29672	49.70796	-1.414194	0.1590
02--C	101.9058	24.93832	4.086314	0.0001
03--C	-235.5718	24.43162	-9.642090	0.0000
04--C	-27.80929	14.07775	-1.975407	0.0497
05--C	-114.6168	14.16543	-8.091303	0.0000
06--C	-23.16130	12.66874	-1.828224	0.0691
07--C	-66.55347	12.84297	-5.182092	0.0000
08--C	-57.54566	13.99315	-4.112417	0.0001
09--C	-87.22227	12.89189	-6.765668	0.0000
10--C	-6.567844	11.82689	-0.555331	0.5793

R-squared	0.944073	Mean dependent var	145.9582
Adjusted R-squared	0.940800	S.D. dependent var	216.8753
S.E. of regression	52.76797	Akaike info criterion	10.82781
Sum squared resid	523478.1	Schwarz criterion	11.02571
Log likelihood	-1070.781	F-statistic	288.4996
Durbin-Watson stat	0.716733	Prob(F-statistic)	0.000000

Dependent Variable: I?
Method: Pooled EGLS (Cross-section random effects)
Sample: 1935 1954
Included observations: 20
Cross-sections included: 10
Total pool (balanced) observations: 200
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-57.83441	28.88930	-2.001932	0.0467
F?	0.109781	0.010489	10.46615	0.0000
C?	0.308113	0.017175	17.93989	0.0000
Random Effects (Cross)				
01--C	-9.524296			
02--C	157.8910			
03--C	-172.8958			
04--C	29.91198			
05--C	-54.67901			
06--C	34.34613			
07--C	-7.897758			
08--C	0.672638			
09--C	-28.13935			
10--C	50.31444			

Effects Specification

Cross-section random S.D. / Rho	84.20095	0.7180
Idiosyncratic random S.D. / Rho	52.76797	0.2820

Weighted Statistics

R-squared	0.769503	Mean dependent var	20.25556
Adjusted R-squared	0.767163	S.D. dependent var	109.3928
S.E. of regression	52.78556	Sum squared resid	548904.1
F-statistic	328.8369	Durbin-Watson stat	0.682684
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.803304	Mean dependent var	145.9582
Sum squared resid	1841062.	Durbin-Watson stat	0.203539

Swamy-Arora utiliza within/between

Ejemplo # 3

La tabla que se presenta a continuación contiene información hipotética de dos variables, Y, X , para cuatro empresas durante cinco años.

Obs.	Y	X	$\left(\bar{J}_N \otimes I_T\right)Y$	$\left(\bar{J}_N \otimes I_T\right)X$
F1-1	94.9599	58.6996	48.88354	40.25191
F1-2	90.9597	64.17575	60.65027	38.86009
F1-3	59.67644	1.80787	49.00015	21.57238
F1-4	81.99586	84.95044	70.47937	66.99965
F1-5	4.49594	62.08417	46.77667	63.04512
F2-1	63.2618	48.631	48.88354	40.25191
F2-2	41.0125	41.28715	60.65027	38.86009
F2-3	97.00632	13.05839	49.00015	21.57238
F2-4	85.22528	72.35931	70.47937	66.99965
F2-5	81.33018	42.96126	46.77667	63.04512
F3-1	16.33637	49.88583	48.88354	40.25191
F3-2	65.45021	31.10691	60.65027	38.86009
F3-3	21.72668	13.9128	49.00015	21.57238
F3-4	60.3256	32.50799	70.47937	66.99965
F3-5	92.39132	61.77211	46.77667	63.04512
F4-1	20.97609	3.79121	48.88354	40.25191
F4-2	45.17865	18.87056	60.65027	38.86009
F4-3	17.59114	57.51045	49.00015	21.57238
F4-4	54.37073	78.18084	70.47937	66.99965
F4-5	8.88924	85.36294	46.77667	63.04512

$Z_{\lambda} = \iota_N \otimes I_T$

1	0	0	0	0
0	1	0	0	0
0	0	1	0	0
0	0	0	1	0
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0	1	0	0	0
0	0	1	0	0
0	0	0	1	0
0	0	0	0	1
1	0	0	0	0
0	1	0	0	0
0	0	1	0	0
0	0	0	1	0
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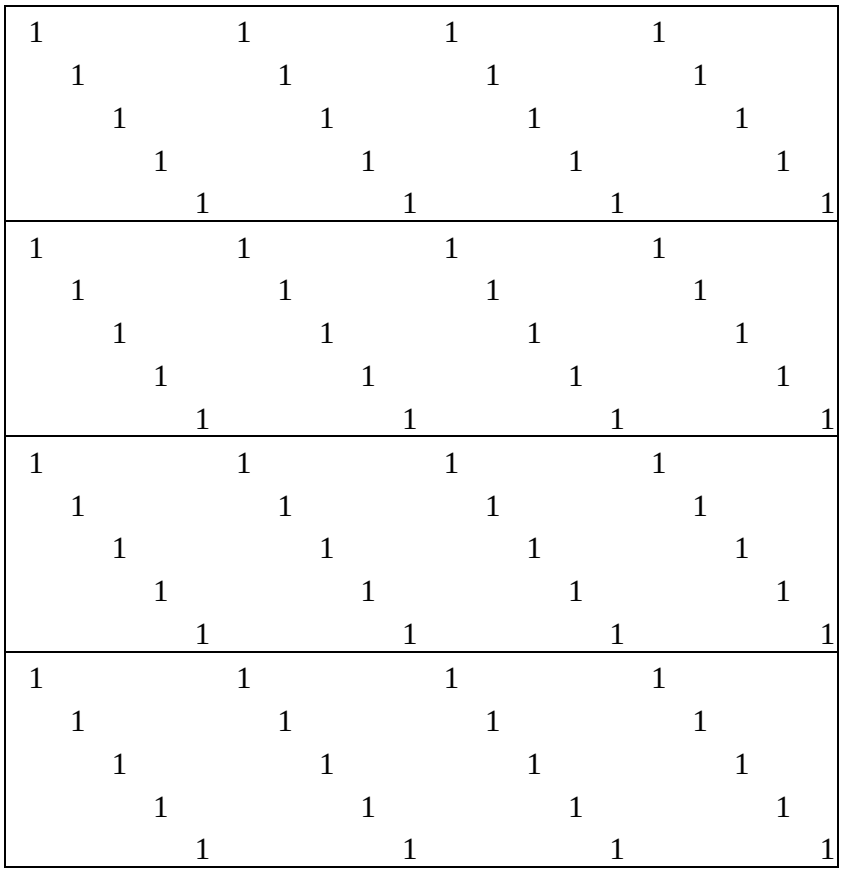
1	0	0	0	0
0	1	0	0	0
0	0	1	0	0
0	0	0	1	0
0	0	0	0	1

$$Z_\lambda Z_\lambda^{'} = J_N \otimes I_T$$



$$Z_{\lambda}\left(Z_{\lambda}^{'}Z_{\lambda}\right)^{-1}Z_{\lambda}^{'}=\bar{J}_{N}\otimes I_{T}$$

0.25					0.25					0.25					0.25				
	0.25					0.25					0.25					0.25			
		0.25					0.25					0.25					0.25		
			0.25					0.25					0.25					0.25	
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			0.25					0.25					0.25					0.25	
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		0.25					0.25					0.25					0.25		
			0.25					0.25					0.25					0.25	
				0.25					0.25					0.25					0.25