

Logit/Probit Models using Panel DataPooled Logit Estimation

```
. logit union age grade not_smsa south southxt
```

```
Iteration 0:   log likelihood = -13864.23
Iteration 1:   log likelihood = -13550.511
Iteration 2:   log likelihood = -13545.74
Iteration 3:   log likelihood = -13545.736
```

Logistic regression	Number of obs	=	26200
	LR chi2(5)	=	636.99
	Prob > chi2	=	0.0000
	Pseudo R2	=	0.0230

Log likelihood = -13545.736

union	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	.0099931	.0026737	3.74	0.000	.0047527	.0152335
grade	.0483487	.0064259	7.52	0.000	.0357541	.0609432
not_smsa	-.2214908	.0355831	-6.22	0.000	-.2912324	-.1517493
south	-.7144461	.0612145	-11.67	0.000	-.8344244	-.5944678
southxt	.0068356	.0052258	1.31	0.191	-.0034067	.0170779
_cons	-1.888256	.113141	-16.69	0.000	-2.110009	-1.666504

Panel Logit Random-Effects Estimation

```
. xtlogit union age grade not_smsa south southxt
```

Fitting comparison model:

```
Iteration 0:   log likelihood = -13864.23
Iteration 1:   log likelihood = -13550.511
Iteration 2:   log likelihood = -13545.74
Iteration 3:   log likelihood = -13545.736
```

Fitting full model:

```
tau = 0.0   log likelihood = -13545.736
tau = 0.1   log likelihood = -12926.225
tau = 0.2   log likelihood = -12419.526
tau = 0.3   log likelihood = -12003.162
tau = 0.4   log likelihood = -11656.844
tau = 0.5   log likelihood = -11367.53
tau = 0.6   log likelihood = -11129.716
tau = 0.7   log likelihood = -10947.266
tau = 0.8   log likelihood = -10845.532
```

```
Iteration 0:   log likelihood = -10947.312
Iteration 1:   log likelihood = -10557.296
Iteration 2:   log likelihood = -10540.582
Iteration 3:   log likelihood = -10540.367
Iteration 4:   log likelihood = -10540.367
Iteration 5:   log likelihood = -10540.366
```

Random-effects logistic regression	Number of obs	=	26200
Group variable: idcode	Number of groups	=	4434

Random effects u_i ~ Gaussian	Obs per group: min	=	1
	avg	=	5.9
	max	=	12

Log likelihood = -10540.366	wald chi2(5)	=	227.30
	Prob > chi2	=	0.0000

union	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	.0093936	.004454	2.11	0.035	.000664	.0181232
grade	.0867878	.0176345	4.92	0.000	.0522247	.1213508
not_smsa	-.2519379	.082334	-3.06	0.002	-.4133095	-.0905663
south	-1.163769	.1114164	-10.45	0.000	-1.382141	-.945397
southxt	.023245	.0078497	2.96	0.003	.0078599	.0386302

variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]		x
age	.0015663	.00106	1.47	0.141	-.000519	.003651	30.538
grade	.0159527	.00476	3.35	0.001	.006619	.025286	12.7934
not_smsa*	.0041239	.02209	0.19	0.852	-.039178	.047425	.251516
south*	-.2064533	.05648	-3.66	0.000	-.31715	-.095756	.381388
southxt	.0051779	.00223	2.32	0.020	.0008	.009556	3.72065

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Alternative Command

```
. clogit union age grade not_smsa south southxt, group(idcode)
note: multiple positive outcomes within groups encountered.
note: 2744 groups (14165 obs) dropped because of all positive or
all negative outcomes.
```

```
Iteration 0: log likelihood = -4516.5769
Iteration 1: log likelihood = -4511.1069
Iteration 2: log likelihood = -4511.1042
Iteration 3: log likelihood = -4511.1042
```

Conditional (fixed-effects) logistic regression	Number of obs	=	12035
	LR chi2(5)	=	78.16
	Prob > chi2	=	0.0000
Log likelihood = -4511.1042	Pseudo R2	=	0.0086

union	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	.0079706	.0050283	1.59	0.113	-.0018848	.0178259
grade	.0811808	.0419138	1.94	0.053	-.0009687	.1633303
not_smsa	.0210368	.1131542	0.19	0.853	-.2007414	.242815
south	-1.007318	.1500498	-6.71	0.000	-1.30141	-.7132256
southxt	.0263495	.0083244	3.17	0.002	.010034	.042665

Pooled Probit Estimation

```
. probit union age grade not_smsa south southxt
```

```
Iteration 0: log likelihood = -13864.23
Iteration 1: log likelihood = -13548.436
Iteration 2: log likelihood = -13547.308
Iteration 3: log likelihood = -13547.308
```

Probit regression	Number of obs	=	26200
	LR chi2(5)	=	633.84
	Prob > chi2	=	0.0000
Log likelihood = -13547.308	Pseudo R2	=	0.0229

union	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	.0059461	.0015798	3.76	0.000	.0028496	.0090425
grade	.02639	.0036651	7.20	0.000	.0192066	.0335735
not_smsa	-.1303911	.0202523	-6.44	0.000	-.1700848	-.0906975
south	-.4027254	.033989	-11.85	0.000	-.4693426	-.3361081
southxt	.0033088	.0029253	1.13	0.258	-.0024247	.0090423
_cons	-1.113091	.0657808	-16.92	0.000	-1.242019	-.9841628

There is no Panel Probit Fixed-Effects Estimation

```
. xtprobit union age grade not_smsa south southxt, fe
Fixed-effects model not available
r(198);
```

Panel Probit Random-Effects Estimation

```
. xtprobit union age grade not_smsa south southxt
```

Fitting comparison model:

```
Iteration 0: log likelihood = -13864.23
```

Iteration 4: log likelihood = -10552.327

Random-effects probit regression
Group variable: idcode

Number of obs = 26200
Number of groups = 4434

Random effects u_i ~ Gaussian

Obs per group: min = 1
avg = 5.9
max = 12

Log likelihood = -10552.327

wald chi2(5) = 220.73
Prob > chi2 = 0.0000

union	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	.0046532	.0025134	1.85	0.064	-.000273	.0095795
grade	.0481056	.0099402	4.84	0.000	.0286232	.0675881
not_smsa	-.1401136	.0460446	-3.04	0.002	-.2303594	-.0498679
south	-.6428989	.0619944	-10.37	0.000	-.7644058	-.521392
southxt	.0130454	.0043914	2.97	0.003	.0044384	.0216525
_cons	-1.872166	.1455716	-12.86	0.000	-2.157481	-1.586851
/lnsig2u	.6105518	.0458732			.5206419	.7004617
sigma_u	1.356999	.031125			1.297346	1.419395
rho	.6480667	.0104626			.6272979	.6682901

Likelihood-ratio test of rho=0: chibar2(01) = 5989.96 Prob >= chibar2 = 0.000