



## Binomial logit: logit

```
. logit work age married children education, nolog
Logistic regression                Number of obs =      2000
                                   LR chi2(4)      =     476.62
                                   Prob > chi2     =     0.0000
Log likelihood = -1027.9144         Pseudo R2      =     0.1882
```

work	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
age	.0579303	.007221	8.02	0.000	.0437774	.0720833
married	.7417775	.1264704	5.87	0.000	.4939001	.9896549
children	.7644882	.0515287	14.84	0.000	.6634938	.8654827
education	.0982513	.0186522	5.27	0.000	.0616936	.1348089
_cons	-4.159247	.3320397	-12.53	0.000	-4.810033	-3.508462

```
. mfx compute
Marginal effects after logit
y = Pr(work) (predict)
= .72678588
```

variable	dy/dx	Std. Err.	z	P> z	[ 95% C.I. ]		X
age	.0115031	.00142	8.08	0.000	.008713	.014293	36.208
married*	.1545671	.02703	5.72	0.000	.101592	.207542	.6705
children	.151803	.00938	16.19	0.000	.133425	.170181	1.6445
educat-n	.0195096	.0037	5.27	0.000	.01226	.02676	13.084

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

```
. mfx compute, at(children=0)
warning: no value assigned in at() for variables age married education;
means used for age married education
Marginal effects after logit
y = Pr(work) (predict)
= .43074191
```

variable	dy/dx	Std. Err.	z	P> z	[ 95% C.I. ]		X
age	.0142047	.00178	7.97	0.000	.01071	.0177	36.208
married*	.1762562	.02825	6.24	0.000	.120897	.231615	.6705
children	.1874551	.01115	16.82	0.000	.165609	.209301	0
educat-n	.0240915	.00458	5.26	0.000	.015115	.033068	13.084

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

## Ordered probit: oprobit

```
. summarize rating83c ia83 dia
```

Variable	Obs	Mean	Std. Dev.	Min	Max
rating83c	98	3.479592	1.17736	2	5
ia83	98	10.11473	7.441946	-13.08016	30.74564
dia	98	.7075242	4.711211	-10.79014	20.05367

```
. tabulate rating83c
```

Bond rating, 1983	Freq.	Percent	Cum.
BA_B_C	26	26.53	26.53
BAA	28	28.57	55.10
AA_A	15	15.31	70.41
AAA	29	29.59	100.00
Total	98	100.00	

```
. ologit rating83c ia83 dia, nolog
```

Ordered logistic regression

Number of obs = 98  
 LR chi2(2) = 11.54  
 Prob > chi2 = 0.0031  
 Pseudo R2 = 0.0434

Log likelihood = -127.27146

rating83c	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
ia83	.0939166	.0296196	3.17	0.002	.0358633 .1519699
dia	-.0866925	.0449789	-1.93	0.054	-.1748496 .0014646
/cut1	-.1853053	.3571432			-.8852931 .5146825
/cut2	1.185726	.3882098			.4248489 1.946603
/cut3	1.908412	.4164895			1.092108 2.724717

```
. predict spBA_B_C spBAA spAA_A spAAA
```

(option pr assumed; predicted probabilities)

```
. summarize spAAA,mean
```

```
. list sp* rating83c if spAAA==r(max)
```

	spBA_B_C	spBAA	spAA_A	spAAA	rati-83c
31.	.0388714	.0985567	.1096733	.7528986	AAA

```
. summarize spBA_B_C, mean
```

```
. list sp* rating83c if spBA_B_C==r(max)
```

	spBA_B_C	spBAA	spAA_A	spAAA	rati-83c
67.	.7158453	.1926148	.0449056	.0466343	AAA

## Truncated regression: truncreg

```
. use laborsub,clear
```

```
. summarize whrs kl6 k618 wa we
```

Variable	Obs	Mean	Std. Dev.	Min	Max
whrs	250	799.84	915.6035	0	4950
kl6	250	.236	.5112234	0	3
k618	250	1.364	1.370774	0	8
wa	250	42.92	8.426483	30	60
we	250	12.352	2.164912	5	17

```
. regress whrs kl6 k618 wa we if whrs>0
```

Source	SS	df	MS			
Model	7326995.15	4	1831748.79	Number of obs =	150	
Residual	94793104.2	145	653745.546	F( 4, 145) =	2.80	
				Prob > F =	0.0281	
				R-squared =	0.0717	
				Adj R-squared =	0.0461	
Total	102120099	149	685369.794	Root MSE =	808.55	

  

whrs	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
kl6	-421.4822	167.9734	-2.51	0.013	-753.4748	-89.48953
k618	-104.4571	54.18616	-1.93	0.056	-211.5538	2.639668
wa	-4.784917	9.690502	-0.49	0.622	-23.9378	14.36797
we	9.353195	31.23793	0.30	0.765	-52.38731	71.0937
_cons	1629.817	615.1301	2.65	0.009	414.0371	2845.597

```
. truncreg whrs kl6 k618 wa we, ll(0) nolog
(note: 100 obs. truncated)
```

```
Truncated regression
```

```
Limit: lower = 0
```

```
upper = +inf
```

```
Log likelihood = -1200.9157
```

```
Number of obs = 150
```

```
Wald chi2(4) = 10.05
```

```
Prob > chi2 = 0.0395
```

whrs	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
eq1						
kl6	-803.0042	321.3614	-2.50	0.012	-1432.861	-173.1474
k618	-172.875	88.72898	-1.95	0.051	-346.7806	1.030579
wa	-8.821123	14.36848	-0.61	0.539	-36.98283	19.34059
we	16.52873	46.50375	0.36	0.722	-74.61695	107.6744
_cons	1586.26	912.355	1.74	0.082	-201.9233	3374.442
sigma						
_cons	983.7262	94.44303	10.42	0.000	798.6213	1168.831

## Censored regression: tobit

```
. use womenwk,clear
. regress lwf age married children education
```

Source	SS	df	MS	
Model	937.873188	4	234.468297	Number of obs = 2000
Residual	3485.34135	1995	1.74703827	F( 4, 1995) = 134.21
Total	4423.21454	1999	2.21271363	Prob > F = 0.0000
				R-squared = 0.2120
				Adj R-squared = 0.2105
				Root MSE = 1.3218

lwf	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	.0363624	.003862	9.42	0.000	.0287885	.0439362
married	.3188214	.0690834	4.62	0.000	.1833381	.4543046
children	.3305009	.0213143	15.51	0.000	.2887004	.3723015
education	.0843345	.0102295	8.24	0.000	.0642729	.1043961
_cons	-1.077738	.1703218	-6.33	0.000	-1.411765	-.7437105

```
. tobit lwf age married children education, ll(0)
Tobit regression
```

Number of obs	=	2000
LR chi2(4)	=	461.85
Prob > chi2	=	0.0000
Pseudo R2	=	0.0645

Log likelihood = -3349.9685

lwf	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	.052157	.0057457	9.08	0.000	.0408888	.0634252
married	.4841801	.1035188	4.68	0.000	.2811639	.6871964
children	.4860021	.0317054	15.33	0.000	.4238229	.5481812
education	.1149492	.0150913	7.62	0.000	.0853529	.1445454
_cons	-2.807696	.2632565	-10.67	0.000	-3.323982	-2.291409
/sigma	1.872811	.040014			1.794337	1.951285

Obs. summary:       657 left-censored observations at lwf<=0  
                   1343 uncensored observations  
                       0 right-censored observations

```
. mfx compute, predict(pr(0,.))
Marginal effects after tobit
y = Pr(lwf>0) (predict, pr(0,.))
= .81920975
```

variable	dy/dx	Std. Err.	z	P> z	[ 95% C.I. ]		X
age	.0073278	.00083	8.84	0.000	.005703	.008952	36.208
married*	.0706994	.01576	4.48	0.000	.039803	.101596	.6705
children	.0682813	.00479	14.26	0.000	.058899	.077663	1.6445
educat-n	.0161499	.00216	7.48	0.000	.011918	.020382	13.084

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

```
. mfx compute, predict(e(0,.))
Marginal effects after tobit
y = E(lwf|lwf>0) (predict, e(0,.))
= 2.3102021
```

variable	dy/dx	Std. Err.	z	P> z	[	95% C.I.	]	X
age	.0314922	.00347	9.08	0.000	.024695	.03829		36.208
married*	.2861047	.05982	4.78	0.000	.168855	.403354		.6705
children	.2934463	.01908	15.38	0.000	.256041	.330852		1.6445
educat-n	.0694059	.00912	7.61	0.000	.051531	.087281		13.084

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

### Regression with selection: heckman

```
. heckman lw education age children, ///
> select(age married children education) nolog
Heckman selection model      Number of obs      =      2000
(regression model with sample selection)  Censored obs      =      657
                                           Uncensored obs    =     1343
                                           Wald chi2(3)      =     454.78
Log likelihood = -1052.857          Prob > chi2       =     0.0000
```

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]
<b>lw</b>					
education	.0397189	.0024525	16.20	0.000	.0349121 .0445256
age	.0075872	.0009748	7.78	0.000	.0056767 .0094977
children	-.0180477	.0064544	-2.80	0.005	-.0306981 -.0053973
_cons	2.305499	.0653024	35.30	0.000	2.177509 2.43349
<b>select</b>					
age	.0350233	.0042344	8.27	0.000	.0267241 .0433225
married	.4547724	.0735876	6.18	0.000	.3105434 .5990014
children	.4538372	.0288398	15.74	0.000	.3973122 .5103621
education	.0565136	.0110025	5.14	0.000	.0349492 .0780781
_cons	-2.478055	.1927823	-12.85	0.000	-2.855901 -2.100208
/athrho	.3377674	.1152251	2.93	0.003	.1119304 .5636045
/lnsigma	-1.375543	.0246873	-55.72	0.000	-1.423929 -1.327156
rho	.3254828	.1030183			.1114653 .5106469
sigma	.2527024	.0062385			.2407662 .2652304
lambda	.0822503	.0273475			.0286501 .1358505

LR test of indep. eqns. (rho = 0): chi2(1) = 5.53 Prob > chi2 = 0.0187

```

. heckman lw education age children, ///
> select(age married children education) twostep
Heckman selection model -- two-step estimates   Number of obs   =   2000
(regression model with sample selection)       Censored obs    =   657
                                                Uncensored obs  =   1343
                                                Wald chi2(6)   =   737.21
                                                Prob > chi2    =   0.0000

```

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
<b>lw</b>						
education	.0427067	.003106	13.75	0.000	.0366191	.0487944
age	.009322	.0014343	6.50	0.000	.0065108	.0121333
children	-.0019549	.0115202	-0.17	0.865	-.0245341	.0206242
_cons	2.124787	.1249789	17.00	0.000	1.879833	2.369741
<b>select</b>						
age	.0347211	.0042293	8.21	0.000	.0264318	.0430105
married	.4308575	.074208	5.81	0.000	.2854125	.5763025
children	.4473249	.0287417	15.56	0.000	.3909922	.5036576
education	.0583645	.0109742	5.32	0.000	.0368555	.0798735
_cons	-2.467365	.1925635	-12.81	0.000	-2.844782	-2.089948
<b>mills</b>						
lambda	.1822815	.0638285	2.86	0.004	.05718	.307383
rho	0.66698					
sigma	.27329216					
lambda	.18228151	.0638285				

## Binomial probit with selection: heckprob

```
. summarize approve fanfred loanamt vacancy med_income appr_value ///
> black appl_income debt_inc_r, sep(0)
```

Variable	Obs	Mean	Std. Dev.	Min	Max
approve	2380	.8802521	.3247347	0	1
fanfred	2095	.3331742	.4714608	0	1
loanamt	2380	139.1353	83.42097	2	980
vacancy	2380	.4365546	.4960626	0	1
med_income	2380	.8294118	.3762278	0	1
appr_value	2380	198.5426	152.9863	25	4316
black	2380	.142437	.3495712	0	1
appl_income	2380	13.9406	116.9485	0	999.9994
debt_inc_r	2380	33.08136	10.72573	0	300

```
. heckprob fanfred loanamt vacancy med_income appr_value, ///
> sel(approve= black appl_income debt_inc_r) nolog
```

```
Probit model with sample selection          Number of obs   =   2380
                                           Censored obs     =   285
                                           Uncensored obs   =   2095
                                           Wald chi2(4)     =   80.69
                                           Prob > chi2      =   0.0000
Log likelihood = -2063.066
```

	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
<b>fanfred</b>						
loanamt	-.0026434	.0008029	-3.29	0.001	-.0042169	-.0010698
vacancy	-.2163306	.0609798	-3.55	0.000	-.3358488	-.0968124
med_income	.2671338	.0893349	2.99	0.003	.0920407	.4422269
appr_value	-.0014358	.0005099	-2.82	0.005	-.0024351	-.0004364
_cons	.1684829	.1182054	1.43	0.154	-.0631954	.4001612
<b>approve</b>						
black	-.7343534	.081858	-8.97	0.000	-.8947921	-.5739147
appl_income	-.0006596	.000236	-2.80	0.005	-.0011221	-.0001971
debt_inc_r	-.0262367	.0036441	-7.20	0.000	-.033379	-.0190944
_cons	2.236424	.1319309	16.95	0.000	1.977844	2.495004
/athrho	-.6006626	.271254	-2.21	0.027	-1.132311	-.0690146
rho	-.5375209	.1928809			-.8118086	-.0689052

```
LR test of indep. eqns. (rho = 0):   chi2(1) =   4.99   Prob > chi2 = 0.0255
```