```
. //
. //                          Binomial probit
. //
. // womenwk from IMEUS
. summarize work age married children education
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
        work |      2000       .6715    .4697852          0          1
         age |      2000      36.208     8.28656         20         59
     married |      2000       .6705    .4701492          0          1
    children |      2000      1.6445    1.398963          0          5
   education |      2000      13.084    3.045912         10         20

. probit work age  married children education, nolog
Probit regression                                 Number of obs   =       2000
                                                  LR chi2(4)      =     478.32
                                                  Prob > chi2     =     0.0000
Log likelihood = -1027.0616                       Pseudo R2       =     0.1889

------------------------------------------------------------------------------
        work |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         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
------------------------------------------------------------------------------

. //
. //                            Marginal effects (AMEs)
. //
. margins, dydx(_all)
Average marginal effects                          Number of obs   =       2000
Model VCE    : OIM

Expression   : Pr(work), predict()
dy/dx w.r.t. : age married children education

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         age |   .0100768   .0011647     8.65   0.000     .0077941    .0123595
     married |   .1250441   .0210541     5.94   0.000     .0837788    .1663094
    children |   .1298233   .0068418    18.98   0.000     .1164137    .1432329
   education |   .0169386   .0031183     5.43   0.000     .0108269    .0230504
------------------------------------------------------------------------------

. // marginal effects for specific values of explanatory variables
. margins, dydx(_all) over(children)
Average marginal effects                          Number of obs   =       2000
Model VCE    : OIM
```

```
Expression   : Pr(work), predict()
dy/dx w.r.t. : age married children education
over         : children
```

	Delta-method				
	dy/dx	Std. Err.	z	P>|z|	[95% Conf.	Interval]
age						
children						
0	.0122895	.0013949	8.81	0.000	.0095555	.0150236
1	.0118794	.0013592	8.74	0.000	.0092154	.0145434
2	.0103799	.0011888	8.73	0.000	.0080498	.0127099
3	.0082797	.0010587	7.82	0.000	.0062047	.0103547
4	.0038001	.00063	6.03	0.000	.0025652	.0050349
5	.0009481	.0002622	3.62	0.000	.0004342	.001462
married						
children						
0	.1525019	.0259523	5.88	0.000	.1016363	.2033675
1	.1474125	.0245563	6.00	0.000	.099283	.1955419
2	.1288045	.0223317	5.77	0.000	.0850352	.1725737
3	.1027434	.0178269	5.76	0.000	.0678032	.1376835
4	.0471552	.0087329	5.40	0.000	.0300391	.0642714
5	.0117653	.0029637	3.97	0.000	.0059567	.017574
children						
children						
0	.1583306	.0094474	16.76	0.000	.1398141	.1768471
1	.1530466	.0099778	15.34	0.000	.1334904	.1726028
2	.1337274	.007549	17.71	0.000	.1189316	.1485231
3	.1066703	.0040684	26.22	0.000	.0986964	.1146441
4	.0489575	.0030526	16.04	0.000	.0429744	.0549406
5	.012215	.0024817	4.92	0.000	.007351	.017079
education						
children						
0	.0206581	.0037314	5.54	0.000	.0133447	.0279715
1	.0199687	.0036937	5.41	0.000	.0127291	.0272083
2	.017448	.0032004	5.45	0.000	.0111753	.0237207
3	.0139178	.0026805	5.19	0.000	.008664	.0191715
4	.0063877	.0013844	4.61	0.000	.0036743	.0091011
5	.0015937	.0005207	3.06	0.002	.0005732	.0026143

```
. margins, dydx(_all) over(married children)
Average marginal effects                        Number of obs   =       2000
Model VCE    : OIM
Expression   : Pr(work), predict()
dy/dx w.r.t. : age married children education
over         : married children
```

	Delta-method				
	dy/dx	Std. Err.	z	P>|z|	[95% Conf.	Interval]
age						
married#						

children						
0 0	.0101772	.0012324	8.26	0.000	.0077618	.0125926
0 1	.0128782	.0014693	8.76	0.000	.0099984	.015758
0 2	.0125766	.0014342	8.77	0.000	.0097657	.0153876
0 3	.0111407	.0013874	8.03	0.000	.0084214	.01386
0 4	.0066499	.0009966	6.67	0.000	.0046965	.0086033
0 5	.0030729	.0006206	4.95	0.000	.0018567	.0042892
1 0	.0129026	.0014692	8.78	0.000	.0100231	.0157822
1 1	.011531	.0013277	8.68	0.000	.0089288	.0141333
1 2	.0080563	.0009752	8.26	0.000	.0061449	.0099678
1 3	.0053679	.0008026	6.69	0.000	.0037948	.006941
1 4	.0026145	.0005241	4.99	0.000	.0015873	.0036418
1 5	.0008761	.0002533	3.46	0.001	.0003797	.0013725
married						
married#						
children						
0 0	.1262901	.0185512	6.81	0.000	.0899304	.1626498
0 1	.1598069	.026885	5.94	0.000	.1071133	.2125004
0 2	.1560647	.0290645	5.37	0.000	.0990992	.2130301
0 3	.1382456	.0264296	5.23	0.000	.0864445	.1900466
0 4	.0825189	.0178597	4.62	0.000	.0475147	.1175232
0 5	.0381323	.0104974	3.63	0.000	.0175577	.0587069
1 0	.1601096	.0282537	5.67	0.000	.1047334	.2154858
1 1	.1430895	.0238027	6.01	0.000	.0964371	.1897419
1 2	.0999715	.0154146	6.49	0.000	.0697594	.1301837
1 3	.066611	.0095902	6.95	0.000	.0478146	.0854075
1 4	.0324439	.0054681	5.93	0.000	.0217267	.0431611
1 5	.0108718	.0027682	3.93	0.000	.0054462	.0162974
children						
married#						
children						
0 0	.1311169	.0061968	21.16	0.000	.1189715	.1432624
0 1	.1659147	.0101364	16.37	0.000	.1460477	.1857817
0 2	.1620295	.0104555	15.50	0.000	.1415371	.1825219
0 3	.1435293	.007698	18.64	0.000	.1284415	.1586172
0 4	.0856728	.0051047	16.78	0.000	.0756678	.0956779
0 5	.0395897	.0054331	7.29	0.000	.028941	.0502385
1 0	.166229	.0109681	15.16	0.000	.1447319	.1877261
1 1	.1485584	.0100644	14.76	0.000	.1288326	.1682843
1 2	.1037925	.0056113	18.50	0.000	.0927945	.1147904
1 3	.0691569	.0035835	19.30	0.000	.0621334	.0761803
1 4	.0336839	.0036321	9.27	0.000	.0265651	.0408028
1 5	.0112873	.0024416	4.62	0.000	.0065019	.0160728
education						
married#						
children						
0 0	.0171074	.0032533	5.26	0.000	.0107311	.0234838
0 1	.0216477	.0039896	5.43	0.000	.0138283	.029467
0 2	.0211407	.0038668	5.47	0.000	.0135619	.0287195
0 3	.0187269	.0035581	5.26	0.000	.0117532	.0257007
0 4	.0111781	.0022001	5.08	0.000	.006866	.0154902
0 5	.0051655	.0013474	3.83	0.000	.0025246	.0078063

```
        1 0 |   .0216887   .0038982     5.56   0.000     .0140483     .029329
        1 1 |   .0193831   .0035977     5.39   0.000     .0123317    .0264345
        1 2 |   .0135423   .0025446     5.32   0.000     .0085549    .0185297
        1 3 |   .0090232   .0018804     4.80   0.000     .0053378    .0127087
        1 4 |   .0043949   .0011037     3.98   0.000     .0022318     .006558
        1 5 |   .0014727   .0004977     2.96   0.003     .0004973    .0024481
------------+----------------------------------------------------------------

. //
. //                          Binomial 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     .0437773    .0720833
     married |   .7417775   .1264705     5.87   0.000     .4938998    .9896552
    children |   .7644882   .0515289    14.84   0.000     .6634935     .865483
   education |   .0982513   .0186522     5.27   0.000     .0616936     .134809
       _cons |  -4.159247   .3320401   -12.53   0.000    -4.810034   -3.508461
------------------------------------------------------------------------------

. margins, dydx(_all)
Average marginal effects                          Number of obs   =       2000
Model VCE    : OIM
Expression   : Pr(work), predict()
dy/dx w.r.t. : age married children education

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         age |   .0099674   .0011682     8.53   0.000     .0076778    .0122569
     married |    .127629    .021152     6.03   0.000     .0861717    .1690862
    children |   .1315365    .007073    18.60   0.000     .1176736    .1453994
   education |   .0169049   .0031243     5.41   0.000     .0107814    .0230285
------------------------------------------------------------------------------

. //
. //                          Ordered logit
. //
. // panel84extract from IMEUS
. // dia: change in Inc/Asset ratio, 1982-1983
. 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; Log likelihood = -127.27146; Pseudo R2 = 0.0434

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			-.8852932	.5146826
/cut2	1.185726	.3882099			.4248488	1.946604
/cut3	1.908412	.4164896			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

```
. //
. //                          Poisson regression
. //
. use mus17data, clear
. summarize docvis private medicaid age age2 educyr actlim totchr, sep(0)
```

Variable	Obs	Mean	Std. Dev.	Min	Max
docvis	3677	6.822682	7.394937	0	144
private	3677	.4966005	.5000564	0	1
medicaid	3677	.166712	.3727692	0	1
age	3677	74.24476	6.376638	65	90
age2	3677	5552.936	958.9996	4225	8100

```
      educyr |      3677    11.18031    3.827676          0         17
      actlim |      3677     .333152    .4714045          0          1
      totchr |      3677    1.843351    1.350026          0          8

. tab docvis
```

# doctor visits	Freq.	Percent	Cum.
0	401	10.91	10.91
1	314	8.54	19.45
2	358	9.74	29.18
3	334	9.08	38.26
4	339	9.22	47.48
5	266	7.23	54.72
6	231	6.28	61.00
7	202	5.49	66.49
8	179	4.87	71.36
9	154	4.19	75.55
10	108	2.94	78.49
11	127	3.45	81.94
12	89	2.42	84.36
13	85	2.31	86.67
14	81	2.20	88.88
15	70	1.90	90.78
16	51	1.39	92.17
17	43	1.17	93.34
18	33	0.90	94.23
19	27	0.73	94.97
20	26	0.71	95.68
21	19	0.52	96.19
22	21	0.57	96.76
23	17	0.46	97.23
24	15	0.41	97.63
25	6	0.16	97.80
26	5	0.14	97.93
27	11	0.30	98.23
28	4	0.11	98.34
29	6	0.16	98.50
30	8	0.22	98.72
31	2	0.05	98.78
32	6	0.16	98.94
33	3	0.08	99.02
34	3	0.08	99.10
35	5	0.14	99.24
36	1	0.03	99.27
37	2	0.05	99.32
38	2	0.05	99.37
39	2	0.05	99.43
40	4	0.11	99.54
41	2	0.05	99.59
42	1	0.03	99.62
43	2	0.05	99.67
44	2	0.05	99.73
47	2	0.05	99.78
48	2	0.05	99.84
50	1	0.03	99.86

```
        54 |          1        0.03       99.89
        59 |          1        0.03       99.92
        73 |          1        0.03       99.95
       106 |          1        0.03       99.97
       144 |          1        0.03      100.00
-----------+-----------------------------------
     Total |      3,677      100.00
```

```
. poisson docvis private medicaid age age2 educyr actlim totchr, nolog

Poisson regression                              Number of obs   =       3677
                                                LR chi2(7)      =    4477.98
                                                Prob > chi2     =     0.0000
Log likelihood =  -15019.64                     Pseudo R2       =     0.1297

------------------------------------------------------------------------------
      docvis |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     private |   .1422324   .0143311     9.92   0.000      .114144    .1703208
    medicaid |   .0970005   .0189307     5.12   0.000     .0598969     .134104
         age |   .2936722   .0259563    11.31   0.000     .2427988    .3445457
        age2 |  -.0019311   .0001724   -11.20   0.000    -.0022691   -.0015931
      educyr |   .0295562    .001882    15.70   0.000     .0258676    .0332449
      actlim |   .1864213    .014566    12.80   0.000     .1578726    .2149701
      totchr |   .2483898   .0046447    53.48   0.000     .2392864    .2574933
       _cons |  -10.18221   .9720115   -10.48   0.000    -12.08732   -8.277101
------------------------------------------------------------------------------

. // std errors may be biased in presence of overdispersion
. poisson docvis i.private i.medicaid age age2 educyr i.actlim totchr, ///
> nolog robust

Poisson regression                              Number of obs   =       3677
                                                Wald chi2(7)    =     720.43
                                                Prob > chi2     =     0.0000
Log pseudolikelihood =  -15019.64               Pseudo R2       =     0.1297

------------------------------------------------------------------------------
             |               Robust
      docvis |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   1.private |   .1422324    .036356     3.91   0.000      .070976    .2134889
  1.medicaid |   .0970005   .0568264     1.71   0.088    -.0143773    .2083783
         age |   .2936722   .0629776     4.66   0.000     .1702383    .4171061
        age2 |  -.0019311   .0004166    -4.64   0.000    -.0027475   -.0011147
      educyr |   .0295562   .0048454     6.10   0.000     .0200594     .039053
   1.actlim |   .1864213   .0396569     4.70   0.000     .1086953    .2641474
      totchr |   .2483898   .0125786    19.75   0.000     .2237361    .2730435
       _cons |  -10.18221   2.369212    -4.30   0.000    -14.82578   -5.538638
------------------------------------------------------------------------------

. // average marginal effects
. margins, dydx(_all)

Average marginal effects                        Number of obs   =       3677
Model VCE    : Robust

Expression   : Predicted number of events, predict()
dy/dx w.r.t. : 1.private 1.medicaid age age2 educyr 1.actlim totchr

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
```

```
   1.private |   .9701906   .2473149     3.92   0.000     .4854622    1.454919
  1.medicaid |   .6830664   .4153252     1.64   0.100     -.130956    1.497089
         age |   2.003632   .4303207     4.66   0.000     1.160219    2.847045
        age2 |  -.0131753   .0028473    -4.63   0.000    -.0187559   -.0075947
      educyr |   .2016526   .0337805     5.97   0.000     .1354441    .2678612
    1.actlim |   1.295942   .2850588     4.55   0.000     .7372367    1.854647
      totchr |   1.694685   .0908883    18.65   0.000     1.516547    1.872823
------------------------------------------------------------------------------
Note: dy/dx for factor levels is the discrete change from the base level.
. //
. //                          negative binomial (NB) regression
. //
. nbreg docvis i.private i.medicaid age age2 educyr i.actlim totchr, nolog
Negative binomial regression                    Number of obs   =       3677
                                                LR chi2(7)      =     773.44
Dispersion     = mean                           Prob > chi2     =     0.0000
Log likelihood = -10589.339                     Pseudo R2       =     0.0352
------------------------------------------------------------------------------
      docvis |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   1.private |   .1640928   .0332186     4.94   0.000     .0989856    .2292001
  1.medicaid |    .100337   .0454209     2.21   0.027     .0113137    .1893603
         age |   .2941294   .0601588     4.89   0.000     .1762203    .4120384
        age2 |  -.0019282   .0004004    -4.82   0.000    -.0027129   -.0011434
      educyr |   .0286947   .0042241     6.79   0.000     .0204157    .0369737
    1.actlim |   .1895376   .0347601     5.45   0.000      .121409    .2576662
      totchr |   .2776441   .0121463    22.86   0.000     .2538378    .3014505
       _cons |  -10.29749   2.247436    -4.58   0.000    -14.70238   -5.892595
-------------+----------------------------------------------------------------
    /lnalpha |  -.4452773   .0306758                     -.5054007   -.3851539
-------------+----------------------------------------------------------------
       alpha |   .6406466   .0196523                      .6032638    .6803459
------------------------------------------------------------------------------
Likelihood-ratio test of alpha=0:  chibar2(01) = 8860.60 Prob>=chibar2 = 0.000
. margins, dydx(_all)
Average marginal effects                        Number of obs   =       3677
Model VCE    : OIM
Expression   : Predicted number of events, predict()
dy/dx w.r.t. : 1.private 1.medicaid age age2 educyr 1.actlim totchr
------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   1.private |   1.130404   .2304905     4.90   0.000     .6786506    1.582157
  1.medicaid |   .7141864   .3342986     2.14   0.033     .0589732      1.3694
         age |   2.026561   .4175534     4.85   0.000     1.208172    2.844951
        age2 |  -.0132851   .0027785    -4.78   0.000    -.0187308   -.0078393
      educyr |   .1977075    .029502     6.70   0.000     .1398847    .2555303
    1.actlim |   1.328824   .2500674     5.31   0.000      .838701    1.818947
      totchr |   1.912978   .0981225    19.50   0.000     1.720661    2.105294
------------------------------------------------------------------------------
Note: dy/dx for factor levels is the discrete change from the base level.

. //
. //                          zero-inflated Poisson regression
```

```
. //
. use mus17data_z, replace
. summarize er age actlim totchr
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
          er |      3677    .2774001    .6929326          0         10
         age |      3677    74.24476    6.376638         65         90
      actlim |      3677     .333152    .4714045          0          1
      totchr |      3677    1.843351    1.350026          0          8
. tab er
# Emergency |
Room Visits |      Freq.     Percent        Cum.
------------+-----------------------------------
          0 |      2,967       80.69       80.69
          1 |        515       14.01       94.70
          2 |        128        3.48       98.18
          3 |         40        1.09       99.27
          4 |         15        0.41       99.67
          5 |          8        0.22       99.89
          6 |          2        0.05       99.95
          7 |          1        0.03       99.97
         10 |          1        0.03      100.00
------------+-----------------------------------
      Total |      3,677      100.00
. poisson er age actlim totchr, nolog
Poisson regression                              Number of obs   =       3677
                                                LR chi2(3)      =     355.22
                                                Prob > chi2     =     0.0000
Log likelihood = -2433.4807                     Pseudo R2       =     0.0680
------------------------------------------------------------------------------
          er |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         age |   .0078597   .0049196     1.60   0.110    -.0017826    .0175021
      actlim |   .6862348   .0699713     9.81   0.000     .5490935    .8233761
      totchr |   .2439328    .022543    10.82   0.000     .1997493    .2881162
       _cons |  -2.709086   .3695379    -7.33   0.000    -3.433367   -1.984805
------------------------------------------------------------------------------
. zip er age actlim totchr, inflate(age actlim totchr) nolog
Zero-inflated Poisson regression                Number of obs   =       3677
                                                Nonzero obs     =        710
                                                Zero obs        =       2967
Inflation model = logit                         LR chi2(3)      =      24.74
Log likelihood  = -2330.582                     Prob > chi2     =     0.0000
------------------------------------------------------------------------------
          er |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
er           |
         age |   .0008593   .0080323     0.11   0.915    -.0148837    .0166024
      actlim |   .2402562   .1207042     1.99   0.047     .0036804     .476832
      totchr |   .1332187   .0388752     3.43   0.001     .0570247    .2094128
       _cons |  -.8134282   .6126304    -1.33   0.184    -2.014162    .3873054
-------------+----------------------------------------------------------------
inflate      |
         age |  -.0125277    .013236    -0.95   0.344    -.0384698    .0134144
```

```
      actlim |  -.7789124   .1923261    -4.05   0.000    -1.155865   -.4019602
      totchr |  -.2172748   .0663943    -3.27   0.001    -.3474053   -.0871444
       _cons |   2.121419      .9931     2.14   0.033     .1749787    4.067859
------------------------------------------------------------------------------

. //
. //                          zero-inflated negative binomial regression
. //
. nbreg er age actlim totchr, nolog
Negative binomial regression                      Number of obs   =       3677
                                                  LR chi2(3)      =     225.15
Dispersion     = mean                             Prob > chi2     =     0.0000
Log likelihood = -2314.4927                       Pseudo R2       =     0.0464
------------------------------------------------------------------------------
          er |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         age |   .0088528   .0061341     1.44   0.149    -.0031697    .0208754
      actlim |   .6859572   .0848127     8.09   0.000     .5197274    .8521869
      totchr |   .2514885   .0292559     8.60   0.000     .1941481     .308829
       _cons |  -2.799848   .4593974    -6.09   0.000    -3.700251   -1.899446
-------------+----------------------------------------------------------------
    /lnalpha |   .4464685   .1091535                      .2325315    .6604055
-------------+----------------------------------------------------------------
       alpha |   1.562783   .1705834                       1.26179    1.935577
------------------------------------------------------------------------------
Likelihood-ratio test of alpha=0:  chibar2(01) =  237.98 Prob>=chibar2 = 0.000
. zinb er age actlim totchr, inflate(age actlim totchr) ///
> vuong nolog
Zero-inflated negative binomial regression        Number of obs   =       3677
                                                  Nonzero obs     =        710
                                                  Zero obs        =       2967
Inflation model = logit                           LR chi2(3)      =      34.29
Log likelihood  = -2304.868                       Prob > chi2     =     0.0000
------------------------------------------------------------------------------
          er |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
er           |
         age |   .0035485   .0076344     0.46   0.642    -.0114146    .0185116
      actlim |   .2743106   .1768941     1.55   0.121    -.0723954    .6210165
      totchr |   .1963408   .0558635     3.51   0.000     .0868504    .3058313
       _cons |  -1.822978   .6515914    -2.80   0.005    -3.100074   -.5458825
-------------+----------------------------------------------------------------
inflate      |
         age |  -.0236763   .0284226    -0.83   0.405    -.0793835    .0320309
      actlim |   -4.22705   18.91192    -0.22   0.823    -41.29372    32.83962
      totchr |  -.3471091   .2052892    -1.69   0.091    -.7494686    .0552505
       _cons |   1.846526   2.071003     0.89   0.373    -2.212565    5.905618
-------------+----------------------------------------------------------------
    /lnalpha |   .1602371    .235185     0.68   0.496    -.3007171    .6211913
-------------+----------------------------------------------------------------
       alpha |   1.173789   .2760576                       .7402871    1.861144
------------------------------------------------------------------------------
Vuong test of zinb vs. standard negative binomial: z =     1.99  Pr>z = 0.0233

. //
. //                          Truncated regression
```

```
. //
. // laborsub from IMEUS
. 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              Number of obs =     150
-------------+------------------------------           F(  4,   145) =    2.80
       Model |  7326995.15     4  1831748.79           Prob > F      =  0.0281
    Residual |  94793104.2   145  653745.546           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                      Number of obs =    150
         upper =       +inf                      Wald chi2(4)  =  10.05
Log likelihood = -1200.9157                      Prob > chi2   = 0.0395

------------------------------------------------------------------------------
        whrs |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         kl6 |  -803.0042   321.3614    -2.50   0.012    -1432.861   -173.1474
        k618 |   -172.875   88.72898    -1.95   0.051    -346.7806    1.030578
          wa |  -8.821122   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 |   983.7262   94.44303    10.42   0.000     798.6213    1168.831
------------------------------------------------------------------------------

. //
. //                        Censored regression (tobit)
. //
. // womenwk from IMEUS
. use womenwk,clear
. regress lwf age married children education
      Source |       SS       df       MS              Number of obs =    2000
-------------+------------------------------           F(  4,  1995) =  134.21
```

```
      Model |  937.873188     4  234.468297           Prob > F      =  0.0000
   Residual |  3485.34135  1995  1.74703827           R-squared     =  0.2120
-------------+----------------------------------     Adj R-squared =  0.2105
      Total |  4423.21454  1999  2.21271363           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
Log likelihood = -3349.9685                       Pseudo R2       =     0.0645

------------------------------------------------------------------------------
         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

. margins, predict(pr(0,.)) dydx(_all)
Average marginal effects                          Number of obs   =       2000
Model VCE    : OIM

Expression   : Pr(lwf>0), predict(pr(0,.))
dy/dx w.r.t. : age married children education

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         age |   .0071483   .0007873     9.08   0.000     .0056052    .0086914
     married |   .0663585   .0142009     4.67   0.000     .0385254    .0941917
    children |   .0666082   .0044677    14.91   0.000     .0578516    .0753649
   education |   .0157542   .0020695     7.61   0.000     .0116981    .0198103
------------------------------------------------------------------------------

. //
. //                        Regression with selection (heckman)
. //
. // note sign switch on children from tobit
. // twostep: note children now insignif in wage eqn
. 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
```

lw	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lw						
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
select						
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(3)       =    405.68
                                                Prob > chi2        =    0.0000
```

lw	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lw						
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
select						
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

```
mills            |
      lambda |   .1822815   .0638285     2.86   0.004       .05718     .307383
-------------+----------------------------------------------------------------
         rho |     0.66698
       sigma |   .27329216
      lambda |   .18228151   .0638285
------------------------------------------------------------------------------

. //
. //                          Binomial probit with selection (heckprob)
. //
. // hmda from IMEUS
. 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
Log likelihood = -2063.066                      Prob > chi2        =    0.0000
------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
fanfred      |
     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
-------------+----------------------------------------------------------------
approve      |
       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
------------------------------------------------------------------------------
```