EXEMPLO DE PROBIT COM VARIÁVEL EXPLICATIVA ENDÓGENA (CONTÍNUA)

I) Método baseado na "control function"

1. Regressão OLS da v. endógena educ sobre as v. exógenas + instrumentos

```
. reg educ nwifeinc exper expersq age kidslt6 kidsge6 motheduc fatheduc huseduc

      Source |       SS       df       MS              Number of obs =     753
-------------+------------------------------           F(  9,   743) =   74.07
       Model |  1849.07781     9   205.45309            Prob > F      =  0.0000
    Residual |  2060.96203   743  2.77383853            R-squared     =  0.4729
-------------+------------------------------           Adj R-squared =  0.4665
       Total |  3910.03984   752  5.19952106            Root MSE      =  1.6655

------------------------------------------------------------------------------
        educ |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    nwifeinc |   .0156893   .0058267     2.69   0.007     .0042506     .027128
       exper |   .0577544   .0220604     2.62   0.009     .0144462    .1010625
     expersq |   -.000784    .000721    -1.09   0.277    -.0021994    .0006314
         age |  -.0059011   .0098709    -0.60   0.550    -.0252792     .013477
     kidslt6 |   .1195954   .1307071     0.91   0.360    -.1370038    .3761945
     kidsge6 |  -.0731404   .0515299    -1.42   0.156     -.174302    .0280212
    motheduc |   .1300347   .0225669     5.76   0.000     .0857322    .1743373
    fatheduc |   .0950702   .0214618     4.43   0.000     .0529373    .1372032
     huseduc |   .3475092   .0235063    14.78   0.000     .3013626    .3936558
       _cons |    5.43695   .5873755     9.26   0.000     4.283837    6.590064
------------------------------------------------------------------------------

. predict vhat, residuals
```

2. Probit

```
. probit inlf nwifeinc educ exper expersq age kidslt6 kidsge6 vhat, vce(bootstrap)
(running probit on estimation sample)

Bootstrap replications (50)
----+--- 1 ---+--- 2 ---+--- 3 ---+--- 4 ---+--- 5
..................................................    50

Probit regression                                 Number of obs      =       753
                                                  Replications       =        50
                                                  Wald chi2(8)       =    263.79
                                                  Prob > chi2        =    0.0000
Log likelihood = -400.92551                       Pseudo R2          =    0.2213

------------------------------------------------------------------------------
             |   Observed   Bootstrap                         Normal-based
        inlf |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    nwifeinc |  -.0102851   .0056429    -1.82   0.068    -.0213451    .0007749
        educ |   .1035752   .0433481     2.39   0.017     .0186144     .188536
       exper |   .1262477   .0208564     6.05   0.000       .08537    .1671255
     expersq |  -.0019432   .0007375    -2.63   0.008    -.0033887   -.0004976
         age |  -.0543808   .0087342    -6.23   0.000    -.0714996   -.0372621
     kidslt6 |  -.8630859   .1196817    -7.21   0.000    -1.097658   -.6285142
     kidsge6 |   .0313802   .0431719     0.73   0.467    -.0532352    .1159955
        vhat |   .0433658    .054472     0.80   0.426    -.0633973    .1501289
       _cons |   .6209105   .6852738     0.91   0.365    -.7222014    1.964022
------------------------------------------------------------------------------
```

1. Regressão OLS da da v. endógena nwifeinc sobre as v. exógenas + instrumentos

```
. reg  nwifeinc educ exper expersq age kidslt6 kidsge6 huseduc

      Source |       SS       df       MS              Number of obs =     753
-------------+------------------------------           F(  7,   745) =   27.13
       Model |  20676.7705     7  2953.82436            Prob > F      =  0.0000
    Residual |  81120.3451   745  108.886369            R-squared     =  0.2031
-------------+------------------------------           Adj R-squared =  0.1956
       Total |  101797.116   752  135.368505            Root MSE      =  10.435

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    nwifeinc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        educ |   .6746951   .2136829     3.16   0.002     .2552029    1.094187
       exper |  -.3129877   .1382549    -2.26   0.024    -.5844034   -.0415721
     expersq |  -.0004776   .0045196    -0.11   0.916    -.0093501     .008395
         age |   .3401521   .0597084     5.70   0.000     .2229354    .4573687
     kidslt6 |   .8262719   .8183785     1.01   0.313    -.7803305    2.432874
     kidsge6 |   .4355289   .3219888     1.35   0.177    -.1965845    1.067642
     huseduc |   1.178155   .1609449     7.32   0.000     .8621956    1.494115
       _cons |  -14.72048   3.787326    -3.89   0.000    -22.15559   -7.285383
------------------------------------------------------------------------------

. predict vhat2, residuals
```

2. Probit

```
. probit inlf nwifeinc educ exper expersq age kidslt6 kidsge6 vhat2, vce(bootstrap)
(running probit on estimation sample)

Bootstrap replications (50)
----+--- 1 ---+--- 2 ---+--- 3 ---+--- 4 ---+--- 5
..................................................    50

Probit regression                                 Number of obs      =       753
                                                  Replications       =        50
                                                  Wald chi2(8)       =    183.56
                                                  Prob > chi2        =    0.0000
Log likelihood = -400.30301                       Pseudo R2          =    0.2225

------------------------------------------------------------------------------
             |   Observed   Bootstrap                         Normal-based
        inlf |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    nwifeinc |  -.0368641   .0151335    -2.44   0.015    -.0665252    -.007203
        educ |   .1702153    .035103     4.85   0.000     .1014146    .2390159
       exper |   .1163123   .0173595     6.70   0.000     .0822883    .1503363
     expersq |  -.0019459   .0005085    -3.83   0.000    -.0029425   -.0009492
         age |   -.044953   .0088325    -5.09   0.000    -.0622643   -.0276418
     kidslt6 |  -.8444363   .1315826    -6.42   0.000    -1.102333   -.5865392
     kidsge6 |   .0477905   .0449188     1.06   0.287    -.0402488    .1358298
       vhat2 |   .0267093   .0153284     1.74   0.081    -.0033339    .0567525
       _cons |   .0171187    .475421     0.04   0.971    -.9146893    .9489267
------------------------------------------------------------------------------
```

3. Encontrar o coef. de nwifeinc na escala original, alfa1

```
. g alfa1= (-.0368641)/sqrt(1+ .0267093^2* 81120.3451/745)

. sum alfa1

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       alfa1 |       753   -.0355107           0  -.0355107  -.0355107
```

4. Encontrar o efeito parcial médio de nwifeinc, APEy2

```
. predict fitind, xb

. g phi=normalden(fitind)

. sum phi

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
         phi |       753    .2999569    .0936115   .0084762   .3989423

. g APEy2=alfa1*phi

. sum APEy2

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       APEy2 |       753   -.0106517    .0033242  -.0141667   -.000301
```

II) Método baseado na CML – IV PROBIT

```
. ivprobit inlf educ exper expersq age kidslt6 kidsge6 (nwifeinc = huseduc)

Fitting exogenous probit model

Iteration 0:   log likelihood =  -514.8732
Iteration 1:   log likelihood = -402.06651
Iteration 2:   log likelihood = -401.30273
Iteration 3:   log likelihood = -401.30219
Iteration 4:   log likelihood = -401.30219

Fitting full model

Iteration 0:   log likelihood = -3231.6413
Iteration 1:   log likelihood = -3230.8589
Iteration 2:   log likelihood = -3230.6427
Iteration 3:   log likelihood = -3230.6421
Iteration 4:   log likelihood = -3230.6421

Probit model with endogenous regressors           Number of obs   =        753
                                                  Wald chi2(7)    =     200.50
Log likelihood = -3230.6421                       Prob > chi2     =     0.0000
```

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------------------------------------------------------------------------------
             |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    nwifeinc |  -.0355242   .0161905    -2.19   0.028     -.067257   -.0037914
        educ |   .1640288    .031225     5.25   0.000      .102829    .2252286
       exper |   .1120851   .0211991     5.29   0.000     .0705357    .1536345
     expersq |  -.0018751   .0005915    -3.17   0.002    -.0030345   -.0007158
         age |  -.0433193   .0113314    -3.82   0.000    -.0655285   -.0211101
      kidslt6 |  -.8137463   .1299442    -6.26   0.000    -1.068432   -.5590602
      kidsge6 |   .0460535   .0431386     1.07   0.286    -.0384966    .1306037
        _cons |   .0164977   .5300825     0.03   0.975    -1.022445     1.05544
-------------+----------------------------------------------------------------
      /athrho |   .2737883   .1929624     1.42   0.156    -.1044109    .6519876
     /lnsigma |   2.339812   .0257684    90.80   0.000     2.289307    2.390317
-------------+----------------------------------------------------------------
          rho |   .2671463   .1791912                     -.1040332    .5730065
        sigma |   10.37928   .2674576                      9.868095    10.91695
------------------------------------------------------------------------------
Instrumented:  nwifeinc
Instruments:   educ exper expersq age kidslt6 kidsge6 huseduc
------------------------------------------------------------------------------
Wald test of exogeneity (/athrho = 0): chi2(1) =     2.01 Prob > chi2 = 0.1559
```

CÁLCULO DO APE DE nwifeinc

```
. margins, dydx (nwifeinc) – NÃO FUNCIONA

Average marginal effects                        Number of obs   =        753
Model VCE    : OIM

Expression   : Fitted values, predict()
dy/dx w.r.t. : nwifeinc

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             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
    nwifeinc |  -.0355242   .0161905    -2.19   0.028     -.067257   -.0037914
------------------------------------------------------------------------------


. predict fitind2, xb

. g phi2=normalden(fitind2)

. g APEy22=-.0355242 *phi2

. sum APEy22

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
      APEy22 |       753   -.0105637    .0034517  -.0141721  -7.50e-06
```