BINARY RESPONSE WITH PANEL DATA

Dados: lfp

```
. xtset id period
       panel variable:  id (strongly balanced)
        time variable:  period, 1 to 5
                delta:  1 unit
```

MODELO LINEAR COM EFEITOS FIXOS

```
. xtreg lfp kids lhinc per2-per5, fe vce(cluster id)

Fixed-effects (within) regression               Number of obs      =     28315
Group variable: id                              Number of groups   =      5663

R-sq:  within  = 0.0031                         Obs per group: min =         5
       between = 0.0103                                        avg =       5.0
       overall = 0.0091                                        max =         5

                                                F(6,5662)          =      5.61
corr(u_i, Xb)  = -0.0073                        Prob > F           =    0.0000

                                    (Std. Err. adjusted for 5663 clusters in id)
------------------------------------------------------------------------------
             |               Robust
         lfp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        kids |  -.0388976   .0091682    -4.24   0.000    -.0568708   -.0209244
       lhinc |  -.0089439   .0045947    -1.95   0.052    -.0179513    .0000635
        per2 |  -.0042799    .003401    -1.26   0.208    -.0109472    .0023875
        per3 |  -.0108953   .0041859    -2.60   0.009    -.0191012   -.0026894
        per4 |  -.0123002   .0044918    -2.74   0.006    -.0211058   -.0034945
        per5 |  -.0176797   .0048541    -3.64   0.000    -.0271957   -.0081637
       _cons |   .8090216   .0375234    21.56   0.000     .7354614    .8825818
-------------+----------------------------------------------------------------
     sigma_u |  .42247488
     sigma_e |  .21363541
         rho |  .79636335   (fraction of variance due to u_i)
------------------------------------------------------------------------------
```

POOLED PROBIT

```
. probit lfp kids lhinc educ black age agesq per2-per5, vce(cluster id)


Probit regression                                 Number of obs   =      28315
                                                  Wald chi2(10)   =     537.36
                                                  Prob > chi2     =     0.0000
Log pseudolikelihood = -16556.671                 Pseudo R2       =     0.0651
                                    (Std. Err. adjusted for 5663 clusters in id)
------------------------------------------------------------------------------
             |               Robust
         lfp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        kids |  -.1989144   .0153153   -12.99   0.000    -.2289319   -.1688969
       lhinc |  -.2110738   .0242901    -8.69   0.000    -.2586816   -.1634661
        educ |   .0796863   .0065453    12.17   0.000     .0668577    .0925149
       black |   .2209396   .0659041     3.35   0.001       .09177    .3501093
         age |   .1449159   .0122179    11.86   0.000     .1209693    .1688624
       agesq |  -.0019912   .0001522   -13.08   0.000    -.0022895   -.0016928
        per2 |  -.0124245   .0104551    -1.19   0.235    -.0329162    .0080672
        per3 |  -.0325178   .0127431    -2.55   0.011    -.0574938   -.0075418
        per4 |   -.046097   .0136286    -3.38   0.001    -.0728087   -.0193853
        per5 |  -.0577767    .014632    -3.95   0.000    -.0864548   -.0290985
       _cons |  -1.064449    .261872    -4.06   0.000    -1.577709   -.5511895
------------------------------------------------------------------------------
```

```
. margins, dydx (kids lhinc)

Average marginal effects                        Number of obs   =      28315
Model VCE    : Robust

Expression   : Pr(lfp), predict()
dy/dx w.r.t. : kids lhinc
------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        kids |  -.0660184   .0049222   -13.41   0.000    -.0756657   -.0563711
       lhinc |   -.070054   .0079821    -8.78   0.000    -.0856987   -.0544093
------------------------------------------------------------------------------
```

CORRELATED EFFECTS PROBIT: MUNDLACK DEVICE

```
. egen kidsbar=mean(kids), by(id)
. egen lhincbar=mean(lhinc), by(id)
```

POOLED PROBIT

```
. probit lfp kids lhinc educ black age agesq kidsbar lhincbar per2-per5,
vce(cluster id)

Iteration 0:   log pseudolikelihood = -17709.021
Iteration 1:   log pseudolikelihood = -16521.245
Iteration 2:   log pseudolikelihood = -16516.437
Iteration 3:   log pseudolikelihood = -16516.436

Probit regression                                 Number of obs   =      28315
                                                  Wald chi2(12)   =     538.09
                                                  Prob > chi2     =     0.0000
Log pseudolikelihood = -16516.436                 Pseudo R2       =     0.0673

                                  (Std. Err. adjusted for 5663 clusters in id)
------------------------------------------------------------------------------
             |               Robust
         lfp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        kids |  -.1173749   .0269743    -4.35   0.000    -.1702435   -.0645064
       lhinc |  -.0288098    .014344    -2.01   0.045    -.0569234   -.0006961
        educ |   .0841338   .0067302    12.50   0.000     .0709428    .0973248
       black |   .2030668   .0663945     3.06   0.002     .0729359    .3331976
         age |   .1516424   .0124831    12.15   0.000      .127176    .1761089
       agesq |  -.0020672   .0001553   -13.31   0.000    -.0023717   -.0017628
     kidsbar |  -.0856913   .0311857    -2.75   0.006     -.146814   -.0245685
    lhincbar |  -.2501781   .0352907    -7.09   0.000    -.3193466   -.1810097
        per2 |  -.0135701   .0103752    -1.31   0.191    -.0339051    .0067648
        per3 |  -.0331991   .0127197    -2.61   0.009    -.0581293    -.008269
        per4 |  -.0390317   .0136244    -2.86   0.004    -.0657351   -.0123284
        per5 |  -.0552425   .0146067    -3.78   0.000    -.0838711   -.0266139
       _cons |  -.7260562   .2836985    -2.56   0.010    -1.282095   -.1700173
------------------------------------------------------------------------------

. margins, dydx (kids lhinc)

Average marginal effects                        Number of obs   =      28315
Model VCE    : Robust

Expression   : Pr(lfp), predict()
dy/dx w.r.t. : kids lhinc
```

```
------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        kids |   -.038852   .0089243    -4.35   0.000    -.0563433   -.0213608
       lhinc |  -.0095363   .0047482    -2.01   0.045    -.0188426     -.00023
------------------------------------------------------------------------------
```

RE PROBIT

```
. xtprobit lfp kids lhinc educ black age agesq kidsbar lhincbar per2-per5, re

Fitting comparison model:
Iteration 0:   log likelihood = -17709.021
Iteration 1:   log likelihood = -16521.245
Iteration 2:   log likelihood = -16516.437
Iteration 3:   log likelihood = -16516.436

Fitting full model:
rho =  0.0     log likelihood = -16516.436
rho =  0.1     log likelihood = -14581.008
rho =  0.2     log likelihood = -13246.031
rho =  0.3     log likelihood = -12241.869
rho =  0.4     log likelihood = -11445.007
rho =  0.5     log likelihood = -10789.414
rho =  0.6     log likelihood = -10236.335
rho =  0.7     log likelihood = -9764.6817
rho =  0.8     log likelihood =  -9377.716
Iteration 0:   log likelihood = -9772.0683
Iteration 1:   log likelihood = -8851.7517
Iteration 2:   log likelihood = -8752.5509
Iteration 3:   log likelihood = -8658.0381  (not concave)
Iteration 4:   log likelihood = -8658.0381  (not concave)
Iteration 5:   log likelihood = -8625.1183  (not concave)
Iteration 6:   log likelihood = -8616.7164
Iteration 7:   log likelihood = -8610.2065
Iteration 8:   log likelihood = -8609.9006
Iteration 9:   log likelihood = -8609.9002

Random-effects probit regression              Number of obs      =     28315
Group variable: id                            Number of groups   =      5663

Random effects u_i ~ Gaussian                 Obs per group: min =         5
                                                             avg =       5.0
                                                             max =         5

                                              Wald chi2(12)      =    623.40
Log likelihood  = -8609.9002                  Prob > chi2        =    0.0000
------------------------------------------------------------------------------
         lfp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        kids |  -.3970102   .0701298    -5.66   0.000     -.534462   -.2595584
       lhinc |  -.1003399   .0469979    -2.13   0.033    -.1924541   -.0082258
        educ |   .3189079    .024327    13.11   0.000     .2712279     .366588
       black |   .6388784   .1903525     3.36   0.001     .2657945    1.011962
         age |   .7282057   .0445623    16.34   0.000     .6408651    .8155462
       agesq |  -.0098358   .0005747   -17.11   0.000    -.0109623   -.0087094
     kidsbar |  -.4085664   .0898875    -4.55   0.000    -.5847428   -.2323901
    lhincbar |  -.8941069   .1199703    -7.45   0.000    -1.129244   -.6589695
        per2 |  -.0451653   .0499429    -0.90   0.366    -.1430516     .052721
        per3 |  -.1247056   .0501522    -2.49   0.013    -.2230022    -.026409
        per4 |  -.1356834   .0500679    -2.71   0.007    -.2338147   -.0375522
        per5 |   -.200357    .049539    -4.04   0.000    -.2974515   -.1032624
```

```
       _cons |  -5.359375   1.000514    -5.36   0.000    -7.320346   -3.398404
-------------+----------------------------------------------------------------
    /lnsig2u |   2.947234   .0435842                      2.861811    3.032657
-------------+----------------------------------------------------------------
     sigma_u |   4.364995   .0951224                      4.182484     4.55547
         rho |   .9501326    .002065                       .945926    .9540279
------------------------------------------------------------------------------
Likelihood-ratio test of rho=0: chibar2(01) =  1.6e+04 Prob >= chibar2 = 0.000

. margins, dydx (kids lhinc) Não funciona

. margins, predict(pu0) dydx (kids lhinc)

Average marginal effects                        Number of obs     =     28,315
Model VCE    : OIM

Expression   : Pr(lfp=1 | u_i=0), predict(pu0)
dy/dx w.r.t. : kids lhinc

------------------------------------------------------------------------------
             |            Delta-method
             |      dy/dx   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       kids |  -.0276336   .0051034    -5.41   0.000    -.0376361   -.0176311
      lhinc |  -.0069841   .0032927    -2.12   0.034    -.0134377   -.0005305
------------------------------------------------------------------------------
```

FIXED EFFECTS LOGIT

```
. xtlogit lfp kids lhinc  per2-per5, fe
note: multiple positive outcomes within groups encountered.
note: 4608 groups (23040 obs) dropped because of all positive or
      all negative outcomes.

Iteration 0:   log likelihood = -2016.7565
Iteration 1:   log likelihood = -2003.4478
Iteration 2:   log likelihood = -2003.4184
Iteration 3:   log likelihood = -2003.4184

Conditional fixed-effects logistic regression   Number of obs      =      5275
Group variable: id                              Number of groups   =      1055

                                                Obs per group: min =         5
                                                               avg =       5.0
                                                               max =         5

                                                LR chi2(6)         =     57.27
Log likelihood  = -2003.4184                    Prob > chi2        =    0.0000

------------------------------------------------------------------------------
         lfp |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       kids |  -.6438386   .1247828    -5.16   0.000    -.8884084   -.3992688
      lhinc |  -.1842911   .0826019    -2.23   0.026    -.3461878   -.0223943
       per2 |  -.0928039   .0889937    -1.04   0.297    -.2672283    .0816205
       per3 |  -.2247989   .0887976    -2.53   0.011     -.398839   -.0507587
       per4 |  -.2479323   .0888953    -2.79   0.005     -.422164   -.0737006
       per5 |  -.3563745   .0888354    -4.01   0.000    -.5304886   -.1822604
------------------------------------------------------------------------------
```