```
library(plm)

## Warning: package 'plm' was built under R version 3.5.3
```

dados <- read_excel(file.choose(),

col_types = c("text", "date",

"numeric", "numeric", "numeric", "numeric",

"numeric", "numeric", "numeric", "numeric", "numeric",

"numeric", "numeric", "numeric", "numeric", "numeric"))

```
names(dados)

##  [1] "nome"          "data"          "roe"           "endividamento" "
investimento"  "tamanho"
##  [7] "liquidez"      "instreceita"   "concentracao"  "eat"           "
divlajida"     "dummiemin"
## [13] "dummiemin2"    "divcorr"       "divpl"         "divpl2"

pgr <- plm.data(dados, index=c("nome", "data"))

## Warning: use of 'plm.data' is discouraged, better use 'pdata.frame' in
stead
```

MQO (Pooled):

```
gr_pool <- plm(dummiemin ~ roe+endividamento+investimento+tamanho+liquide
z+instreceita+concentracao+eat
               , data=pgr, model="pooling")
summary(gr_pool)

## Pooling Model
##
## Call:
## plm(formula = dummiemin ~ roe + endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat, data = pgr,
##     model = "pooling")
##
## Unbalanced Panel: n = 440, T = 1-16, N = 5171
##
## Residuals:
##       Min.    1st Qu.     Median    3rd Qu.       Max.
## -1.0017026  0.0022185  0.0040278  0.0057007  0.1671823
```

```
##
## Coefficients:
##                  Estimate  Std. Error  t-value  Pr(>|t|)
## (Intercept)    9.6252e-01  8.7817e-03 109.6051 < 2.2e-16 ***
## roe           -6.5040e-09  1.0679e-09  -6.0904 1.208e-09 ***
## endividamento  5.5033e-04  3.4528e-04   1.5939    0.1110
## investimento   5.7317e-03  8.0250e-03   0.7142    0.4751
## tamanho        6.8884e-04  5.0595e-04   1.3615    0.1734
## liquidez       4.0685e-07  2.6438e-07   1.5389    0.1239
## instreceita    3.8749e-02  6.7562e-03   5.7353 1.029e-08 ***
## concentracao  -1.9943e-03  3.3404e-03  -0.5970    0.5505
## eat           -7.9201e-06  4.8174e-05  -0.1644    0.8694
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    22.898
## Residual Sum of Squares: 22.572
## R-Squared:      0.014226
## Adj. R-Squared: 0.012699
## F-statistic: 9.31197 on 8 and 5162 DF, p-value: 7.7977e-13
```

Estimador entre grupos:

```
gr_entre <- plm(dummiemin~roe+endividamento+investimento+tamanho+liquidez
+instreceita+concentracao+eat, data=pgr, model="between")
```

Efeitos fixos:

```
gr_fe <- plm(dummiemin ~ roe+endividamento+investimento+tamanho+liquidez+
instreceita+concentracao+eat, data=pgr, model="within")
summary(gr_fe)
```

```
## Oneway (individual) effect Within Model
##
## Call:
## plm(formula = dummiemin ~ roe + endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat, data = pgr,
##     model = "within")
##
## Unbalanced Panel: n = 440, T = 1-16, N = 5171
##
## Residuals:
##        Min.     1st Qu.      Median     3rd Qu.        Max.
## -9.3799e-01 -9.3451e-04 -4.7251e-05  8.6457e-04  2.5074e-01
##
## Coefficients:
##                  Estimate  Std. Error t-value  Pr(>|t|)
## roe           -5.5530e-09  1.0604e-09 -5.2367 1.706e-07 ***
## endividamento  1.2379e-03  4.1845e-03  0.2958   0.76736
## investimento   1.9074e-02  8.5408e-03  2.2333   0.02558 *
## tamanho       -2.9722e-03  5.2017e-03 -0.5714   0.56777
```

```
## liquidez       5.8631e-08  3.5452e-07  0.1654   0.86865
## instreceita   -7.7473e-03  9.8280e-03 -0.7883   0.43057
## concentracao  -1.6310e-02  1.3307e-02 -1.2256   0.22041
## eat            6.1683e-08  4.7288e-05  0.0013   0.99896
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    18.715
## Residual Sum of Squares: 18.581
## R-Squared:      0.0071655
## Adj. R-Squared: -0.0868
## F-statistic: 4.26087 on 8 and 4723 DF, p-value: 4.0863e-05
```

Teste F para os efeitos fixos:

```
pFtest(gr_fe, gr_pool)

##
##  F test for individual effects
##
## data:  dummiemin ~ roe + endividamento + investimento + tamanho + liqu
idez +  ...
## F = 2.3107, df1 = 439, df2 = 4723, p-value < 2.2e-16
## alternative hypothesis: significant effects
```

Efeitos aleatæ˜ ¼ã¸³rios:

```
gr_re <- plm(dummiemin ~ roe+endividamento+investimento+tamanho+liquidez+
instreceita+concentracao+eat, data=pgr, model="random", random.method="wa
lhus")
summary(gr_re)

## Oneway (individual) effect Random Effect Model
##    (Wallace-Hussain's transformation)
##
## Call:
## plm(formula = dummiemin ~ roe + endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat, data = pgr,
##     model = "random", random.method = "walhus")
##
## Unbalanced Panel: n = 440, T = 1-16, N = 5171
##
## Effects:
##                      var   std.dev share
## idiosyncratic 0.0039531 0.0628736 0.903
## individual    0.0004241 0.0205927 0.097
## theta:
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## 0.04967 0.35377 0.38091 0.35948 0.39326 0.39326
##
## Residuals:
```

```
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## -0.97096  0.00139  0.00248 -0.00003  0.00373  0.15432
##
## Coefficients:
##                  Estimate  Std. Error z-value  Pr(>|z|)
## (Intercept)    9.7808e-01  1.1977e-02 81.6660 < 2.2e-16 ***
## roe           -6.2113e-09  1.0486e-09 -5.9232 3.157e-09 ***
## endividamento  4.7048e-04  4.8541e-04  0.9692  0.332426
## investimento   4.7290e-03  7.9310e-03  0.5963  0.550991
## tamanho        4.0684e-04  7.1647e-04  0.5678  0.570139
## liquidez       2.1475e-07  2.8355e-07  0.7574  0.448826
## instreceita    2.2484e-02  7.5044e-03  2.9961  0.002735 **
## concentracao  -4.1530e-03  4.7708e-03 -0.8705  0.384025
## eat           -2.5874e-06  4.7043e-05 -0.0550  0.956138
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    38.986
## Residual Sum of Squares: 20.649
## R-Squared:      0.47038
## Adj. R-Squared: 0.46955
## Chisq: 4584.19 on 8 DF, p-value: < 2.22e-16
```

Teste LM para efeitos aleatorios:

```
plmtest(gr_pool)
```

```
##
##  Lagrange Multiplier Test - (Honda) for unbalanced panels
##
## data:  dummiemin ~ roe + endividamento + investimento + tamanho + liqu
idez +  ...
## normal = 14.404, p-value < 2.2e-16
## alternative hypothesis: significant effects
```

Teste de Hausman:

Estimação a partir de dummiemin2 que considera o fluxo de dividendos para todas as empresas com ou sem lucro

```
library(plm)
```

MQO (Pooled):

```
gr_pool <- plm(dummiemin2 ~ roe+endividamento+investimento+tamanho+liquid
ez+instreceita+concentracao+eat
               , data=pgr, model="pooling")
summary(gr_pool)
```

```
## Pooling Model
##
```

```
## Call:
## plm(formula = dummiemin2 ~ roe + endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat, data = pgr,
##     model = "pooling")
##
## Unbalanced Panel: n = 459, T = 1-16, N = 6628
##
## Residuals:
##       Min.    1st Qu.     Median    3rd Qu.       Max.
## -0.9993540  0.0022724  0.0051754  0.0077949  0.1203469
##
## Coefficients:
##                  Estimate  Std. Error  t-value  Pr(>|t|)
## (Intercept)    9.9334e-01  6.3556e-03 156.2924 < 2.2e-16 ***
## roe           -3.4658e-09  8.9846e-10  -3.8574 0.0001157 ***
## endividamento  3.5472e-04  3.0081e-04   1.1792 0.2383514
## investimento   2.9217e-03  3.1115e-03   0.9390 0.3477633
## tamanho       -1.1734e-03  4.0929e-04  -2.8669 0.0041587 **
## liquidez      -7.4565e-07  2.4221e-07  -3.0785 0.0020891 **
## instreceita    3.5341e-02  4.7941e-03   7.3718 1.889e-13 ***
## concentracao  -4.5176e-03  3.3053e-03  -1.3668 0.1717481
## eat            1.7062e-06  5.3456e-05   0.0319 0.9745391
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    36.793
## Residual Sum of Squares: 36.241
## R-Squared:      0.015005
## Adj. R-Squared: 0.013815
## F-statistic: 12.604 on 8 and 6619 DF, p-value: < 2.22e-16
```

Estimador entre grupos:

```
gr_entre <- plm(dummiemin2~roe+endividamento+investimento+tamanho+liquide
z+instreceita+concentracao+eat, data=pgr, model="between")
```

Efeitos fixos:

```
gr_fe <- plm(dummiemin2 ~ roe+endividamento+investimento+tamanho+liquidez
+instreceita+concentracao+eat, data=pgr, model="within")
summary(gr_fe)
```

```
## Oneway (individual) effect Within Model
##
## Call:
## plm(formula = dummiemin2 ~ roe + endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat, data = pgr,
##     model = "within")
##
## Unbalanced Panel: n = 459, T = 1-16, N = 6628
##
```

```
## Residuals:
##        Min.     1st Qu.      Median     3rd Qu.        Max.
## -9.3819e-01 -1.1548e-03 -7.4127e-05  1.2718e-03  2.5096e-01
##
## Coefficients:
##                  Estimate  Std. Error t-value  Pr(>|t|)
## roe           -3.1853e-09  8.8978e-10 -3.5799 0.0003464 ***
## endividamento -8.6847e-04  1.2701e-03 -0.6838 0.4941427
## investimento   6.9327e-03  3.3013e-03  2.1000 0.0357713 *
## tamanho       -1.1577e-02  3.9490e-03 -2.9316 0.0033851 **
## liquidez       1.5105e-07  3.3512e-07  0.4507 0.6522068
## instreceita   -1.6353e-03  7.4324e-03 -0.2200 0.8258630
## concentracao  -2.1497e-02  1.2918e-02 -1.6641 0.0961501 .
## eat           -4.6661e-06  5.3445e-05 -0.0873 0.9304313
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    31.777
## Residual Sum of Squares: 31.643
## R-Squared:      0.0042215
## Adj. R-Squared: -0.071096
## F-statistic: 3.26489 on 8 and 6161 DF, p-value: 0.0010191
```

Teste F para os efeitos fixos:

```
pFtest(gr_fe, gr_pool)

##
##  F test for individual effects
##
## data:  dummiemin2 ~ roe + endividamento + investimento + tamanho + liq
uidez +  ...
## F = 1.955, df1 = 458, df2 = 6161, p-value < 2.2e-16
## alternative hypothesis: significant effects
```

Efeitos aleatórios

```
gr_re <- plm(dummiemin2 ~ roe+endividamento+investimento+tamanho+liquidez
+instreceita+concentracao+eat, data=pgr, model="random", random.method="w
alhus")
summary(gr_re)

## Oneway (individual) effect Random Effect Model
##    (Wallace-Hussain's transformation)
##
## Call:
## plm(formula = dummiemin2 ~ roe + endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat, data = pgr,
##     model = "random", random.method = "walhus")
##
## Unbalanced Panel: n = 459, T = 1-16, N = 6628
```

```
##
## Effects:
##                      var   std.dev share
## idiosyncratic 0.0051653 0.0718698 0.943
## individual    0.0003133 0.0177016 0.057
## theta:
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## 0.02902 0.27642 0.28764 0.27805 0.28764 0.28764
##
## Residuals:
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## -0.97539  0.00173  0.00387 -0.00005  0.00577  0.11277
##
## Coefficients:
##                   Estimate  Std. Error  z-value  Pr(>|z|)
## (Intercept)    9.9763e-01  8.3432e-03 119.5736 < 2.2e-16 ***
## roe           -3.3631e-09  8.8047e-10  -3.8197 0.0001336 ***
## endividamento  3.7690e-04  3.9159e-04   0.9625 0.3358073
## investimento   3.6939e-03  3.0807e-03   1.1991 0.2305015
## tamanho       -1.0447e-03  5.3102e-04  -1.9673 0.0491505 *
## liquidez      -5.0892e-07  2.6850e-07  -1.8954 0.0580350 .
## instreceita    2.6216e-02  5.4884e-03   4.7766 1.783e-06 ***
## concentracao  -5.8842e-03  4.3142e-03  -1.3639 0.1725962
## eat           -9.3740e-08  5.2632e-05  -0.0018 0.9985789
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    39.982
## Residual Sum of Squares: 34.07
## R-Squared:      0.14807
## Adj. R-Squared: 0.14704
## Chisq: 1148.41 on 8 DF, p-value: < 2.22e-16
```

Teste LM para efeitos aleatorios:

```
plmtest(gr_pool)
```

```
##
##  Lagrange Multiplier Test - (Honda) for unbalanced panels
##
## data:  dummiemin2 ~ roe + endividamento + investimento + tamanho + liq
uidez +  ...
## normal = 13.981, p-value < 2.2e-16
## alternative hypothesis: significant effects
```

Teste de Hausman:

```
phtest(gr_re, gr_fe)
```

```
## Error in solve.default(dvcov): system is computationally singular: rec
iprocal condition number = 1.00681e-16
```

Teste de robustez: Estimação do dividendo distribuido aos acionistas

sobre o patrimonio liquido da empresas com ebitda positivo

controlando para dummie de distribuicao de minimo de dividendos

```
library(plm)
```

MQO (Pooled):

```
gr_pool <- plm(divpl ~ dummiemin*(+endividamento+investimento+tamanho+liq
uidez+instreceita+concentracao+eat)
               , data=pgr, model="pooling")
summary(gr_pool)
```

```
## Pooling Model
##
## Call:
## plm(formula = divpl ~ dummiemin * (+endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat), data = pgr
,
##     model = "pooling")
##
## Unbalanced Panel: n = 440, T = 1-16, N = 5171
##
## Residuals:
##      Min.   1st Qu.    Median   3rd Qu.      Max.
## -612809.6  -11048.1   -5839.6    1527.7 3208768.7
##
## Coefficients:
##                             Estimate  Std. Error  t-value  Pr(>|t|)
## (Intercept)              -993299.81   151958.42  -6.5367 6.898e-11 ***
## dummiemin                 932824.66   152233.91   6.1276 9.585e-10 ***
## endividamento             250096.16   404602.52   0.6181   0.53652
## investimento             -250879.27   110798.60  -2.2643   0.02360 *
## tamanho                   175235.96    14406.98  12.1633 < 2.2e-16 ***
## liquidez                    -323.77      495.65  -0.6532   0.51364
## instreceita             -1270049.87   228185.11  -5.5659 2.740e-08 ***
## concentracao             -760412.70    88180.46  -8.6234 < 2.2e-16 ***
## eat                      -825696.93    76967.49 -10.7279 < 2.2e-16 ***
## dummiemin:endividamento  -249584.81   404602.68  -0.6169   0.53735
## dummiemin:investimento    248760.05   111118.06   2.2387   0.02522 *
## dummiemin:tamanho        -170532.07    14416.48 -11.8290 < 2.2e-16 ***
```

```
## dummiemin:liquidez           323.82      495.65   0.6533   0.51357
## dummiemin:instreceita    1266055.66   228296.42   5.5457 3.074e-08 ***
## dummiemin:concentracao    756400.28    88249.41   8.5712 < 2.2e-16 ***
## dummiemin:eat             825691.05    76967.51  10.7278 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    2.912e+13
## Residual Sum of Squares: 2.4427e+13
## R-Squared:      0.16116
## Adj. R-Squared: 0.15871
## F-statistic: 66.0239 on 15 and 5155 DF, p-value: < 2.22e-16
```

Estimador entre grupos:

```
gr_entre <- plm(divpl~dummiemin*(+endividamento+investimento+tamanho+liqu
idez+instreceita+concentracao+eat), data=pgr, model="between")
```

Efeitos fixos:

```
gr_fe <- plm(divpl ~ dummiemin*(+endividamento+investimento+tamanho+liqui
dez+instreceita+concentracao+eat), data=pgr, model="within")
summary(gr_fe)

## Oneway (individual) effect Within Model
##
## Call:
## plm(formula = divpl ~ dummiemin * (+endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat), data = pgr
,
##     model = "within")
##
## Unbalanced Panel: n = 440, T = 1-16, N = 5171
##
## Residuals:
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## -349227   -5120    -971       0    1198 2890811
##
## Coefficients:
##                             Estimate  Std. Error  t-value  Pr(>|t|)
## dummiemin                 922123.34   152920.78   6.0301 1.764e-09 ***
## endividamento            8313973.61   600268.22  13.8504 < 2.2e-16 ***
## investimento             6084349.63   365653.93  16.6396 < 2.2e-16 ***
## tamanho                   291651.21    15970.02  18.2624 < 2.2e-16 ***
## liquidez                    7173.41      649.43  11.0457 < 2.2e-16 ***
## instreceita             -5146838.93   308851.35 -16.6645 < 2.2e-16 ***
## concentracao            -2216551.39   118947.69 -18.6347 < 2.2e-16 ***
## eat                     -1274602.85    78291.01 -16.2803 < 2.2e-16 ***
## dummiemin:endividamento -8313824.22   600234.46 -13.8510 < 2.2e-16 ***
## dummiemin:investimento  -6089186.25   365755.47 -16.6482 < 2.2e-16 ***
## dummiemin:tamanho        -269829.56    15076.76 -17.8971 < 2.2e-16 ***
```

```
## dummiemin:liquidez         -7173.42      649.43 -11.0457 < 2.2e-16 ***
## dummiemin:instreceita    5154502.47   308803.43  16.6919 < 2.2e-16 ***
## dummiemin:concentracao   2181941.85   118268.40  18.4491 < 2.2e-16 ***
## dummiemin:eat            1274602.59    78291.04  16.2803 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    2.5674e+13
## Residual Sum of Squares: 2.0654e+13
## R-Squared:      0.19554
## Adj. R-Squared: 0.1181
## F-statistic: 76.4207 on 15 and 4716 DF, p-value: < 2.22e-16
```

Teste F para os efeitos fixos:

```
pFtest(gr_fe, gr_pool)

##
##  F test for individual effects
##
## data:  divpl ~ dummiemin * (+endividamento + investimento + tamanho +
...
## F = 1.9627, df1 = 439, df2 = 4716, p-value < 2.2e-16
## alternative hypothesis: significant effects
```

Efeitos aleatórios

```
gr_re <- plm(divpl ~ dummiemin*(+endividamento+investimento+tamanho+liqui
dez+instreceita+concentracao+eat), data=pgr, model="random", random.metho
d="walhus")
summary(gr_re)

## Oneway (individual) effect Random Effect Model
##    (Wallace-Hussain's transformation)
##
## Call:
## plm(formula = divpl ~ dummiemin * (+endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat), data = pgr
,
##     model = "random", random.method = "walhus")
##
## Unbalanced Panel: n = 440, T = 1-16, N = 5171
##
## Effects:
##                      var   std.dev share
## idiosyncratic 4.688e+09 6.847e+04 0.989
## individual    5.152e+07 7.178e+03 0.011
## theta:
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## 0.005451 0.064598 0.073466 0.068091 0.077807 0.077807
##
```

```
## Residuals:
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## -613250  -10519   -5522      -9    1376 3187330
##
## Coefficients:
##                            Estimate  Std. Error  z-value  Pr(>|z|)
## (Intercept)              -999677.51   151870.71  -6.5824 4.628e-11 ***
## dummiemin                 939945.12   152104.17   6.1796 6.426e-10 ***
## endividamento             255400.46   404063.90   0.6321   0.52734
## investimento             -248014.97   110377.53  -2.2470   0.02464 *
## tamanho                   175658.79    14348.48  12.2423 < 2.2e-16 ***
## liquidez                    -316.18      495.89  -0.6376   0.52373
## instreceita             -1270836.59   227042.70  -5.5973 2.177e-08 ***
## concentracao             -761710.94    88121.07  -8.6439 < 2.2e-16 ***
## eat                      -825804.48    76511.78 -10.7932 < 2.2e-16 ***
## dummiemin:endividamento  -254893.19   404063.96  -0.6308   0.52816
## dummiemin:investimento    246063.01   110697.55   2.2228   0.02623 *
## dummiemin:tamanho        -171011.61    14356.64 -11.9117 < 2.2e-16 ***
## dummiemin:liquidez           316.23      495.89   0.6377   0.52366
## dummiemin:instreceita    1267302.15   227151.49   5.5791 2.418e-08 ***
## dummiemin:concentracao    757433.82    88181.32   8.5895 < 2.2e-16 ***
## dummiemin:eat             825799.56    76511.80  10.7931 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    2.8649e+13
## Residual Sum of Squares: 2.4119e+13
## R-Squared:      0.15813
## Adj. R-Squared: 0.15568
## Chisq: 968.241 on 15 DF, p-value: < 2.22e-16
```

Teste LM para efeitos aleatorios:

```
plmtest(gr_pool)

##
##  Lagrange Multiplier Test - (Honda) for unbalanced panels
##
## data:  divpl ~ dummiemin * (+endividamento + investimento + tamanho +
...
## normal = 4.6759, p-value = 1.463e-06
## alternative hypothesis: significant effects
```

Teste de Hausman:

```
phtest(gr_re, gr_fe)

##
##  Hausman Test
##
## data:  divpl ~ dummiemin * (+endividamento + investimento + tamanho +
```

```
...
## chisq = 353.15, df = 15, p-value < 2.2e-16
## alternative hypothesis: one model is inconsistent
```

Estimação a partir da divpl que considera

o percentual do dividendo distribuido aos acionistas

sobre o patrimonio liquido da empresas com ebitda positivo

controlando para dummie de distribuicao de minimo de dividendos

```
library(plm)

names(dados)

##  [1] "nome"          "data"          "roe"           "endividamento" "
investimento"  "tamanho"
##  [7] "liquidez"      "instreceita"   "concentracao"  "eat"           "
divlajida"     "dummiemin"
## [13] "dummiemin2"    "divcorr"       "divpl"         "divpl2"

pgr <- plm.data(dados, index=c("nome", "data"))

## Warning: use of 'plm.data' is discouraged, better use 'pdata.frame' in
stead
```

MQO (Pooled):

```
gr_pool <- plm(divpl ~ dummiemin2*(+endividamento+investimento+tamanho+li
quidez+instreceita+concentracao+eat)
               , data=pgr, model="pooling")
summary(gr_pool)

## Pooling Model
##
## Call:
## plm(formula = divpl ~ dummiemin2 * (+endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat), data = pgr
,
##     model = "pooling")
##
## Unbalanced Panel: n = 440, T = 1-16, N = 5171
##
## Residuals:
```

```
##      Min.   1st Qu.    Median   3rd Qu.      Max.
## -612809.6  -11048.1   -5839.6    1527.7 3208768.7
##
## Coefficients:
##                             Estimate  Std. Error  t-value  Pr(>|t|)
## (Intercept)               -993299.81   151958.42  -6.5367 6.898e-11 **
*
## dummiemin2                 932824.66   152233.91   6.1276 9.585e-10 **
*
## endividamento              250096.16   404602.52   0.6181   0.53652
## investimento              -250879.27   110798.60  -2.2643   0.02360 *
## tamanho                    175235.96    14406.98  12.1633 < 2.2e-16 **
*
## liquidez                      -323.77      495.65  -0.6532   0.51364
## instreceita              -1270049.87   228185.11  -5.5659 2.740e-08 **
*
## concentracao              -760412.70    88180.46  -8.6234 < 2.2e-16 **
*
## eat                       -825696.93    76967.49 -10.7279 < 2.2e-16 **
*
## dummiemin2:endividamento  -249584.81   404602.68  -0.6169   0.53735
## dummiemin2:investimento    248760.05   111118.06   2.2387   0.02522 *
## dummiemin2:tamanho        -170532.07    14416.48 -11.8290 < 2.2e-16 **
*
## dummiemin2:liquidez           323.82      495.65   0.6533   0.51357
## dummiemin2:instreceita    1266055.66   228296.42   5.5457 3.074e-08 **
*
## dummiemin2:concentracao    756400.28    88249.41   8.5712 < 2.2e-16 **
*
## dummiemin2:eat             825691.05    76967.51  10.7278 < 2.2e-16 **
*
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    2.912e+13
## Residual Sum of Squares: 2.4427e+13
## R-Squared:      0.16116
## Adj. R-Squared: 0.15871
## F-statistic: 66.0239 on 15 and 5155 DF, p-value: < 2.22e-16
```

Estimador entre grupos:

```
gr_entre <- plm(divpl~dummiemin2*(+endividamento+investimento+tamanho+liq
uidez+instreceita+concentracao+eat), data=pgr, model="between")
```

Efeitos fixos:

```
gr_fe <- plm(divpl ~ dummiemin2*(+endividamento+investimento+tamanho+liqu
idez+instreceita+concentracao+eat), data=pgr, model="within")
summary(gr_fe)
```

```
## Oneway (individual) effect Within Model
##
## Call:
## plm(formula = divpl ~ dummiemin2 * (+endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat), data = pgr
,
##     model = "within")
##
## Unbalanced Panel: n = 440, T = 1-16, N = 5171
##
## Residuals:
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## -349227   -5120    -971       0    1198 2890811
##
## Coefficients:
##                              Estimate  Std. Error  t-value  Pr(>|t|)
## dummiemin2                 922123.34   152920.78   6.0301 1.764e-09 **
*
## endividamento             8313973.61   600268.22  13.8504 < 2.2e-16 **
*
## investimento              6084349.63   365653.93  16.6396 < 2.2e-16 **
*
## tamanho                    291651.21    15970.02  18.2624 < 2.2e-16 **
*
## liquidez                     7173.41      649.43  11.0457 < 2.2e-16 **
*
## instreceita               -5146838.93   308851.35 -16.6645 < 2.2e-16 **
*
## concentracao              -2216551.39   118947.69 -18.6347 < 2.2e-16 **
*
## eat                       -1274602.85    78291.01 -16.2803 < 2.2e-16 **
*
## dummiemin2:endividamento -8313824.22   600234.46 -13.8510 < 2.2e-16 **
*
## dummiemin2:investimento  -6089186.25   365755.47 -16.6482 < 2.2e-16 **
*
## dummiemin2:tamanho        -269829.56    15076.76 -17.8971 < 2.2e-16 **
*
## dummiemin2:liquidez         -7173.42      649.43 -11.0457 < 2.2e-16 **
*
## dummiemin2:instreceita    5154502.47   308803.43  16.6919 < 2.2e-16 **
*
## dummiemin2:concentracao   2181941.85   118268.40  18.4491 < 2.2e-16 **
*
## dummiemin2:eat            1274602.59    78291.04  16.2803 < 2.2e-16 **
*
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    2.5674e+13
```

```
## Residual Sum of Squares: 2.0654e+13
## R-Squared:      0.19554
## Adj. R-Squared: 0.1181
## F-statistic: 76.4207 on 15 and 4716 DF, p-value: < 2.22e-16
```

```
summary(fixef(gr_fe))
```

```
##             Estimate Std. Error  t-value  Pr(>|t|)
## AALR3       -1238274     172549  -7.1764 8.275e-13 ***
## ABEV3       -1179418     182488  -6.4630 1.130e-10 ***
## AFLT3       -1143325     165668  -6.9013 5.835e-12 ***
## AGRO3       -1213665     170763  -7.1073 1.361e-12 ***
## AHEB3       -1164164     179887  -6.4717 1.068e-10 ***
## AHEB5       -1164164     179887  -6.4717 1.068e-10 ***
## AHEB6       -1164164     179887  -6.4717 1.068e-10 ***
## ALPA3       -1232456     173990  -7.0835 1.613e-12 ***
## ALPA4       -1232456     173990  -7.0835 1.613e-12 ***
## ALSO3       -1239960     174826  -7.0926 1.512e-12 ***
## ALUP11      -1245065     177122  -7.0294 2.370e-12 ***
## ALUP3       -1245065     177122  -7.0294 2.370e-12 ***
## ALUP4       -1245065     177122  -7.0294 2.370e-12 ***
## AMAR3       -1248246     172717  -7.2271 5.726e-13 ***
## ANIM3       -1229487     171091  -7.1862 7.710e-13 ***
## APER3       -1194559     170820  -6.9931 3.066e-12 ***
## APTI3       -1195848     169322  -7.0626 1.873e-12 ***
## APTI4       -1195848     169322  -7.0626 1.873e-12 ***
## ARZZ3       -1214664     170378  -7.1292 1.163e-12 ***
## AZEV3       -1167553     170224  -6.8589 7.835e-12 ***
## AZEV4       -1167553     170224  -6.8589 7.835e-12 ***
## AZUL4       -1259220     178352  -7.0603 1.903e-12 ***
## B3SA3       -1270174     179376  -7.0811 1.641e-12 ***
## BAHI3       -1159433     167262  -6.9318 4.715e-12 ***
## BALM3       -1172654     166749  -7.0325 2.320e-12 ***
## BALM4       -1172654     166749  -7.0325 2.320e-12 ***
## BAUH3       -1149935     165174  -6.9620 3.816e-12 ***
## BAUH4       -1149935     165174  -6.9620 3.816e-12 ***
## BDLL3       -1205036     172043  -7.0043 2.833e-12 ***
## BDLL4       -1205036     172043  -7.0043 2.833e-12 ***
## BEEF3       -1269098     176212  -7.2021 6.868e-13 ***
## BIOM3       -1183970     178640  -6.6277 3.792e-11 ***
## BKBR3       -1241987     173225  -7.1698 8.678e-13 ***
## BMKS3       -1172703     172846  -6.7847 1.307e-11 ***
## BOBR3       -1196787     170197  -7.0318 2.331e-12 ***
## BOBR4       -1196787     170197  -7.0318 2.331e-12 ***
## BRAP3       -1241382     177540  -6.9921 3.086e-12 ***
## BRAP4       -1241382     177540  -6.9921 3.086e-12 ***
## BRDT3       -1247779     180417  -6.9161 5.263e-12 ***
## BRFS3       -1306571     180047  -7.2569 4.610e-13 ***
## BRGE11      -1223647     174112  -7.0279 2.395e-12 ***
## BRGE12      -1223647     174112  -7.0279 2.395e-12 ***
```

```
## BRGE3       -1223647     174112  -7.0279 2.395e-12 ***
## BRGE5       -1223647     174112  -7.0279 2.395e-12 ***
## BRGE6       -1223647     174112  -7.0279 2.395e-12 ***
## BRGE7       -1223647     174112  -7.0279 2.395e-12 ***
## BRGE8       -1223647     174112  -7.0279 2.395e-12 ***
## BRKM3       -1235339     181259  -6.8153 1.059e-11 ***
## BRKM5       -1235339     181259  -6.8153 1.059e-11 ***
## BRKM6       -1235339     181259  -6.8153 1.059e-11 ***
## BRML3       -1288414     177877  -7.2433 5.090e-13 ***
## BRPR3       -1254320     176576  -7.1036 1.398e-12 ***
## BSEV3       -1255189     176630  -7.1063 1.370e-12 ***
## BTOW3       -1260689     176830  -7.1294 1.161e-12 ***
## BTTL3       -1165980     167656  -6.9546 4.019e-12 ***
## CABI3B       -974693     161670  -6.0289 1.777e-09 ***
## CACO3B       -970012     161585  -6.0031 2.081e-09 ***
## CALI3       -1131099     165148  -6.8490 8.392e-12 ***
## CALI4       -1131099     165148  -6.8490 8.392e-12 ***
## CAMB3       -1184247     167410  -7.0739 1.727e-12 ***
## CAMB4       -1184247     167410  -7.0739 1.727e-12 ***
## CAML3       -1239438     175140  -7.0768 1.692e-12 ***
## CARD3       -1187892     168409  -7.0536 1.997e-12 ***
## CASN3       -1230371     173610  -7.0870 1.573e-12 ***
## CASN4       -1230371     173610  -7.0870 1.573e-12 ***
## CATA3       -1189354     169154  -7.0312 2.341e-12 ***
## CATA4       -1189354     169154  -7.0312 2.341e-12 ***
## CBEE3       -1250336     176339  -7.0905 1.534e-12 ***
## CCPR3       -1248702     173894  -7.1808 8.012e-13 ***
## CCRO3       -1278124     178683  -7.1530 9.795e-13 ***
## CCXC3       -1133827     167791  -6.7574 1.576e-11 ***
## CEBR3       -1221019     176352  -6.9238 4.988e-12 ***
## CEBR5       -1221019     176352  -6.9238 4.988e-12 ***
## CEBR6       -1221019     176352  -6.9238 4.988e-12 ***
## CEDO3       -1210869     169598  -7.1396 1.079e-12 ***
## CEDO4       -1210869     169598  -7.1396 1.079e-12 ***
## CEEB3       -1244778     177530  -7.0117 2.688e-12 ***
## CEEB5       -1244778     177530  -7.0117 2.688e-12 ***
## CEEB6       -1244778     177530  -7.0117 2.688e-12 ***
## CEED3       -1232464     175624  -7.0176 2.577e-12 ***
## CEED4       -1232464     175624  -7.0176 2.577e-12 ***
## CEGR3       -1230251     174563  -7.0476 2.083e-12 ***
## CELP3       -1239322     176486  -7.0222 2.495e-12 ***
## CELP5       -1239322     176486  -7.0222 2.495e-12 ***
## CELP6       -1239322     176486  -7.0222 2.495e-12 ***
## CELP7       -1239322     176486  -7.0222 2.495e-12 ***
## CEPE3       -1231121     175876  -7.0000 2.920e-12 ***
## CEPE5       -1231121     175876  -7.0000 2.920e-12 ***
## CEPE6       -1231121     175876  -7.0000 2.920e-12 ***
## CESP3       -1251624     179003  -6.9922 3.085e-12 ***
## CESP5       -1251624     179003  -6.9922 3.085e-12 ***
## CESP6       -1251624     179003  -6.9922 3.085e-12 ***
```

```
## CGAS3       -1236588     176485  -7.0068 2.783e-12 ***
## CGAS5       -1236588     176485  -7.0068 2.783e-12 ***
## CGRA3       -1196340     169837  -7.0441 2.137e-12 ***
## CGRA4       -1196340     169837  -7.0441 2.137e-12 ***
## CIEL3       -1165833     180707  -6.4515 1.219e-10 ***
## CLSC3       -1258524     176124  -7.1457 1.033e-12 ***
## CLSC4       -1258524     176124  -7.1457 1.033e-12 ***
## CMIG3       -1289734     180525  -7.1444 1.043e-12 ***
## CMIG4       -1289734     180525  -7.1444 1.043e-12 ***
## CNSY3       -1166575     167629  -6.9593 3.890e-12 ***
## COCE3       -1232372     175480  -7.0229 2.483e-12 ***
## COCE5       -1232372     175480  -7.0229 2.483e-12 ***
## COCE6       -1232372     175480  -7.0229 2.483e-12 ***
## COGN3       -1278555     177847  -7.1891 7.548e-13 ***
## CPFE3       -1285735     180277  -7.1320 1.139e-12 ***
## CPLE3       -1276582     179708  -7.1036 1.397e-12 ***
## CPLE5       -1276582     179708  -7.1036 1.397e-12 ***
## CPLE6       -1276582     179708  -7.1036 1.397e-12 ***
## CPRE3       -1265603     176994  -7.1505 9.971e-13 ***
## CPTP3B      -1015688     163075  -6.2284 5.123e-10 ***
## CRDE3       -1191750     178961  -6.6593 3.067e-11 ***
## CRFB3       -1281789     180486  -7.1019 1.414e-12 ***
## CRPG3       -1181696     170161  -6.9446 4.312e-12 ***
## CRPG5       -1181696     170161  -6.9446 4.312e-12 ***
## CRPG6       -1181696     170161  -6.9446 4.312e-12 ***
## CRTE3B      -1183452     164838  -7.1795 8.090e-13 ***
## CRTE5B      -1183452     164838  -7.1795 8.090e-13 ***
## CSAN3       -1258392     179406  -7.0142 2.640e-12 ***
## CSMG3       -1253021     176619  -7.0945 1.491e-12 ***
## CSNA3       -1282562     180615  -7.1011 1.423e-12 ***
## CSRN3       -1215599     173516  -7.0057 2.804e-12 ***
## CSRN5       -1215599     173516  -7.0057 2.804e-12 ***
## CSRN6       -1215599     173516  -7.0057 2.804e-12 ***
## CTKA3       -1170354     168943  -6.9275 4.860e-12 ***
## CTKA4       -1170354     168943  -6.9275 4.860e-12 ***
## CTNM3       -1239900     173684  -7.1388 1.085e-12 ***
## CTNM4       -1239900     173684  -7.1388 1.085e-12 ***
## CTSA3       -1182087     169589  -6.9703 3.599e-12 ***
## CTSA4       -1182087     169589  -6.9703 3.599e-12 ***
## CTSA8       -1182087     169589  -6.9703 3.599e-12 ***
## CVCB3       -1251551     173648  -7.2074 6.609e-13 ***
## CYRE3       -1269352     176620  -7.1869 7.668e-13 ***
## DASA3       -1241755     175141  -7.0900 1.540e-12 ***
## DIRR3       -1247005     174393  -7.1506 9.971e-13 ***
## DMMO3       -1229446     175110  -7.0210 2.516e-12 ***
## DOHL3       -1212410     169328  -7.1601 9.304e-13 ***
## DOHL4       -1212410     169328  -7.1601 9.304e-13 ***
## DTCY3       -1135275     162940  -6.9675 3.672e-12 ***
## DTCY4       -1135275     162940  -6.9675 3.672e-12 ***
## DTEX3       -1263503     176061  -7.1765 8.267e-13 ***
```

```
## EALT3       -1170730     168258  -6.9579 3.926e-12 ***
## EALT4       -1170730     168258  -6.9579 3.926e-12 ***
## ECOR3       -1246567     175984  -7.0834 1.614e-12 ***
## ECPR3       -1175002     169093  -6.9488 4.185e-12 ***
## ECPR4       -1175002     169093  -6.9488 4.185e-12 ***
## EEEL3       -1238493     174533  -7.0961 1.475e-12 ***
## EEEL4       -1238493     174533  -7.0961 1.475e-12 ***
## EGIE3       -1216754     178155  -6.8297 9.586e-12 ***
## EKTR3       -1236283     176220  -7.0156 2.615e-12 ***
## EKTR4       -1236283     176220  -7.0156 2.615e-12 ***
## ELEK3       -1179306     170124  -6.9320 4.708e-12 ***
## ELEK4       -1179306     170124  -6.9320 4.708e-12 ***
## ELET3       -1323116     185047  -7.1502 9.999e-13 ***
## ELET5       -1323116     185047  -7.1502 9.999e-13 ***
## ELET6       -1323116     185047  -7.1502 9.999e-13 ***
## ELPL3       -1264662     177689  -7.1173 1.267e-12 ***
## EMAE3       -1198114     172495  -6.9458 4.276e-12 ***
## EMAE4       -1198114     172495  -6.9458 4.276e-12 ***
## EMBR3       -1302713     180065  -7.2347 5.419e-13 ***
## ENAT3       -1229837     174354  -7.0537 1.995e-12 ***
## ENBR3       -1272747     178057  -7.1480 1.016e-12 ***
## ENEV3       -1262000     176212  -7.1618 9.192e-13 ***
## ENGI11      -1267445     178920  -7.0839 1.609e-12 ***
## ENGI3       -1267445     178920  -7.0839 1.609e-12 ***
## ENGI4       -1267445     178920  -7.0839 1.609e-12 ***
## ENMA3B      -1242335     175193  -7.0912 1.526e-12 ***
## ENMA5B      -1242335     175193  -7.0912 1.526e-12 ***
## ENMA6B      -1242335     175193  -7.0912 1.526e-12 ***
## ENMT3       -1234869     175147  -7.0505 2.041e-12 ***
## ENMT4       -1234869     175147  -7.0505 2.041e-12 ***
## EQTL3       -1280833     177246  -7.2263 5.760e-13 ***
## ESTR3       -1165532     170037  -6.8546 8.074e-12 ***
## ESTR4       -1165532     170037  -6.8546 8.074e-12 ***
## ETER3       -1221624     171310  -7.1311 1.147e-12 ***
## ETRO3B      -8835816     452082 -19.5447 < 2.2e-16 ***
## EUCA3       -1232187     172117  -7.1590 9.381e-13 ***
## EUCA4       -1232187     172117  -7.1590 9.381e-13 ***
## EVEN3       -1250037     176102  -7.0984 1.450e-12 ***
## EZTC3       -1241662     173409  -7.1603 9.295e-13 ***
## FESA3       -1206412     173043  -6.9718 3.563e-12 ***
## FESA4       -1206412     173043  -6.9718 3.563e-12 ***
## FHER3       -1237621     174157  -7.1063 1.370e-12 ***
## FIGE3       -1161035     179310  -6.4750 1.045e-10 ***
## FIGE4       -1161035     179310  -6.4750 1.045e-10 ***
## FLEX3       -1187658     174078  -6.8226 1.007e-11 ***
## FLRY3       -1240933     173283  -7.1613 9.226e-13 ***
## FRAS3       -1214665     171063  -7.1007 1.427e-12 ***
## FRIO3       -1218710     171015  -7.1263 1.187e-12 ***
## FRRN3B      -1236782     177162  -6.9811 3.336e-12 ***
## FRRN5B      -1236782     177162  -6.9811 3.336e-12 ***
```

```
## FRRN6B      -1236782     177162  -6.9811 3.336e-12 ***
## FRTA3       -1164517     171278  -6.7990 1.185e-11 ***
## GEPA3       -1219618     174997  -6.9694 3.623e-12 ***
## GEPA4       -1219618     174997  -6.9694 3.623e-12 ***
## GFSA3       -1255675     176685  -7.1069 1.365e-12 ***
## GGBR3       -1269254     182008  -6.9736 3.517e-12 ***
## GGBR4       -1269254     182008  -6.9736 3.517e-12 ***
## GNDI3       -1257234     186761  -6.7318 1.876e-11 ***
##  [ reached getOption("max.print") -- omitted 240 rows ]
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Teste F para os efeitos fixos:

```
pFtest(gr_fe, gr_pool)
```

```
##
##  F test for individual effects
##
## data:  divpl ~ dummiemin2 * (+endividamento + investimento + tamanho +
...
## F = 1.9627, df1 = 439, df2 = 4716, p-value < 2.2e-16
## alternative hypothesis: significant effects
```

Efeitos aleatórios:

```
gr_re <- plm(divpl ~ dummiemin2*(+endividamento+investimento+tamanho+liqu
idez+instreceita+concentracao+eat), data=pgr, model="random", random.meth
od="walhus")
summary(gr_re)
```

```
## Oneway (individual) effect Random Effect Model
##    (Wallace-Hussain's transformation)
##
## Call:
## plm(formula = divpl ~ dummiemin2 * (+endividamento + investimento +
##     tamanho + liquidez + instreceita + concentracao + eat), data = pgr
,
##     model = "random", random.method = "walhus")
##
## Unbalanced Panel: n = 440, T = 1-16, N = 5171
##
## Effects:
##                      var   std.dev share
## idiosyncratic 4.688e+09 6.847e+04 0.989
## individual    5.152e+07 7.178e+03 0.011
## theta:
##     Min.  1st Qu.   Median     Mean  3rd Qu.     Max.
## 0.005451 0.064598 0.073466 0.068091 0.077807 0.077807
##
## Residuals:
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## -613250  -10519   -5522      -9    1376 3187330
##
## Coefficients:
##                             Estimate  Std. Error  z-value  Pr(>|z|)
## (Intercept)               -999677.51   151870.71  -6.5824 4.628e-11 **
*
## dummiemin2                 939945.12   152104.17   6.1796 6.426e-10 **
*
## endividamento              255400.46   404063.90   0.6321   0.52734
## investimento              -248014.97   110377.53  -2.2470   0.02464 *
## tamanho                    175658.79    14348.48  12.2423 < 2.2e-16 **
*
## liquidez                      -316.18      495.89  -0.6376   0.52373
## instreceita              -1270836.59   227042.70  -5.5973 2.177e-08 **
*
## concentracao              -761710.94    88121.07  -8.6439 < 2.2e-16 **
*
## eat                       -825804.48    76511.78 -10.7932 < 2.2e-16 **
*
## dummiemin2:endividamento  -254893.19   404063.96  -0.6308   0.52816
## dummiemin2:investimento    246063.01   110697.55   2.2228   0.02623 *
## dummiemin2:tamanho        -171011.61    14356.64 -11.9117 < 2.2e-16 **
*
## dummiemin2:liquidez           316.23      495.89   0.6377   0.52366
## dummiemin2:instreceita    1267302.15   227151.49   5.5791 2.418e-08 **
*
## dummiemin2:concentracao    757433.82    88181.32   8.5895 < 2.2e-16 **
*
## dummiemin2:eat             825799.56    76511.80  10.7931 < 2.2e-16 **
*
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Total Sum of Squares:    2.8649e+13
## Residual Sum of Squares: 2.4119e+13
## R-Squared:      0.15813
## Adj. R-Squared: 0.15568
## Chisq: 968.241 on 15 DF, p-value: < 2.22e-16
```

```
names(dados)
```

```
##  [1] "nome"          "data"          "roe"           "endividamento" "
investimento"  "tamanho"
##  [7] "liquidez"      "instreceita"   "concentracao"  "eat"           "
divlajida"     "dummiemin"
## [13] "dummiemin2"    "divcorr"       "divpl"         "divpl2"
```

Teste LM para efeitos aleat)orios:

```
plmtest(gr_pool)
```

```
##
##  Lagrange Multiplier Test - (Honda) for unbalanced panels
##
## data:  divpl ~ dummiemin2 * (+endividamento + investimento + tamanho +
...
## normal = 4.6759, p-value = 1.463e-06
## alternative hypothesis: significant effects
```

Teste de Hausman:

```
phtest(gr_re, gr_fe)
```

```
##
##  Hausman Test
##
## data:  divpl ~ dummiemin2 * (+endividamento + investimento + tamanho +
...
## chisq = 353.15, df = 15, p-value < 2.2e-16
## alternative hypothesis: one model is inconsistent
```