Trabalho 3 - Econometria Aplicada

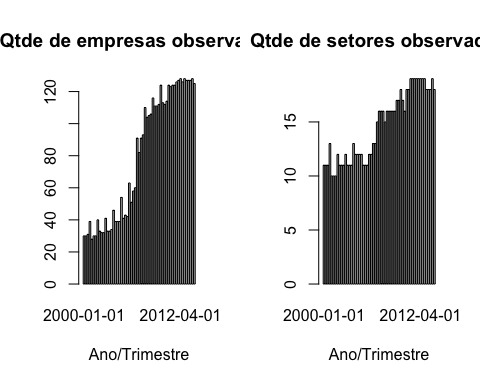
William Viana Borges e Rafael Buttini Salviato

Para realizar a atividade, o conjunto de dados foi adaptado e então as seguintes variáveis foram produzidas:

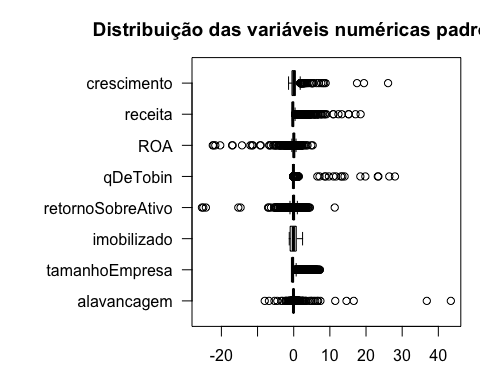
| Nome da variável | Fórmula com base nas colunas dos dados |
| --- | --- |
| alavancagem | longtermdebt/patrimniolquido |
| imobilizado | permanentasset/totalasset |
| tamanhoEmpresa | totalasset |
| retornoSobreAtivo | ebit/totalasset |
| qDeTobin | (shorttermdebt+longtermdebt+shares\_outstanding)/totalasset |
| ROA | netprofit/totalasset |

# 1) Verifique as variáveis e apresente estatísticas descritivas

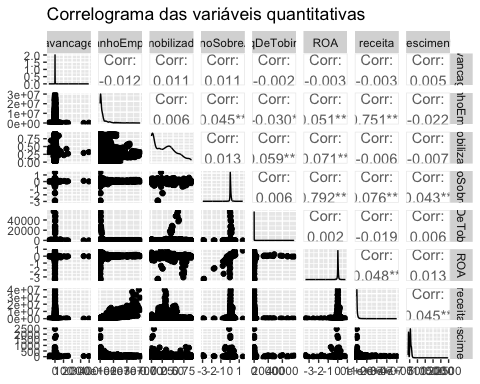
Resp: ao todo, no conjunto de dados final, temos 19 “setoreconomatica”, 57 períodos observados entre o primeiro trimestre de 2000 e o primeiro trimestre de 2014, e 151 “nome\_companhia”. No Gráfico 1, pode-se ver que as empresas e setores não apareceram em todos os períodos observados.



No que diz respeito as variáveis numéricas, o Gráfico 2 evidencia a forte presença de valores discrepantes. Os diagramas de caixa representam a distribuição das variáveis numéricas do estudo, padronizadas da seguinte forma: .



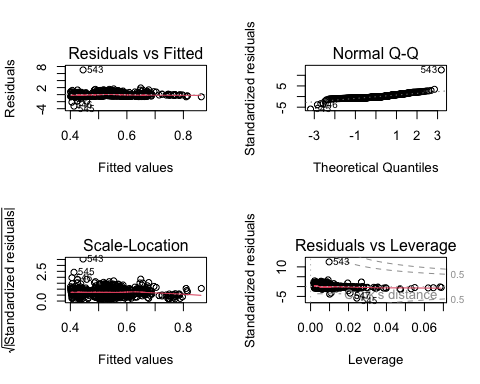
O Gráfico 3 mostra um correlograma, onde mercem destaque três pontos: um, é a alta correlação entre “ROA” e “retornoSobreAtivo” (79,2%), o outro é a alta correlação entre “receita” e “tamanhoEmpresa” (75,1%), e por fim a baixa correlação das variáveis, de um modo geral, com a variável resposta “alavancagem”. Por fim, dado que “retornoSobreAtivo” e “tamanhoEmpresa” possuem uma correlação com a variável resposta “alavancagem” maior do que as variáveis “ROA” e “receita” respectivamentes, estas serão utilizadas no modelo por padrão. A preferência pela remoção das variáveis “ROA” e “receita” é uma medida tomada para evitar multicolinearidade.



# 2) Faça uma regressão Pooled OLS usando erros robustos:

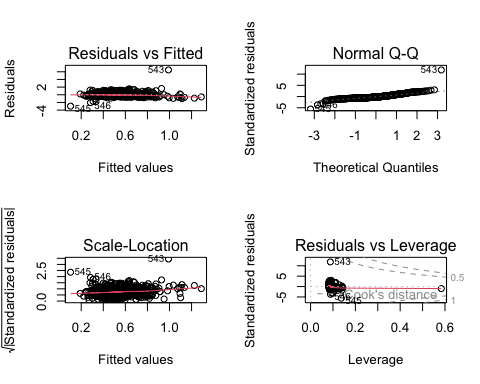
## a. Usando apenas as variáveis principais.

Call:  
lm(formula = alavancagem ~ log\_tamanhoEmpresa + imobilizado +   
 retornoSobreAtivo + qDeTobin + crescimento, data = Base\_2023)  
  
Residuals:  
 Min 1Q Median 3Q Max   
-3.2773 -0.3487 -0.1352 0.2559 7.0315   
  
Coefficients:  
 Estimate Std. Error t value Pr(>|t|)   
(Intercept) 4.166e-01 4.474e-02 9.312 < 2e-16 \*\*\*  
log\_tamanhoEmpresa 1.087e-09 4.032e-09 0.270 0.78746   
imobilizado 2.552e-01 7.840e-02 3.256 0.00119 \*\*   
retornoSobreAtivo 1.656e-03 3.817e-01 0.004 0.99654   
qDeTobin 1.141e-04 4.461e-05 2.558 0.01074 \*   
crescimento 1.898e-04 3.026e-04 0.627 0.53075   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Residual standard error: 0.5646 on 678 degrees of freedom  
Multiple R-squared: 0.02454, Adjusted R-squared: 0.01735   
F-statistic: 3.412 on 5 and 678 DF, p-value: 0.004723



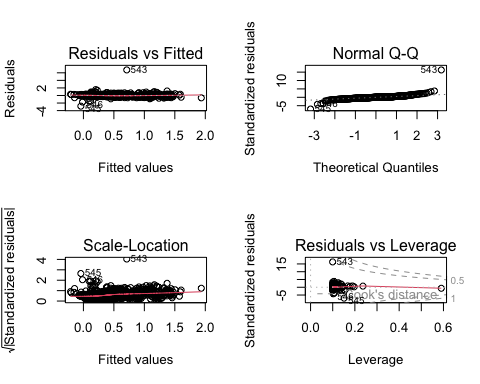
## b. Usando apenas as variáveis principais e os dummies de trimestre

Call:  
lm(formula = alavancagem ~ log\_tamanhoEmpresa + imobilizado +   
 retornoSobreAtivo + qDeTobin + crescimento + factorData,   
 data = Base\_2023)  
  
Residuals:  
 Min 1Q Median 3Q Max   
-2.9680 -0.3236 -0.1238 0.2446 6.4860   
  
Coefficients:  
 Estimate Std. Error t value Pr(>|t|)   
(Intercept) 4.588e-01 1.697e-01 2.704 0.00705 \*\*  
log\_tamanhoEmpresa 6.605e-09 4.434e-09 1.490 0.13680   
imobilizado 1.906e-01 8.397e-02 2.270 0.02355 \*   
retornoSobreAtivo 1.498e-01 4.234e-01 0.354 0.72358   
qDeTobin 1.152e-04 4.559e-05 2.526 0.01178 \*   
crescimento 4.818e-04 9.893e-04 0.487 0.62639   
factorData2000-04-01 -5.513e-02 2.551e-01 -0.216 0.82895   
factorData2000-07-01 -3.507e-02 2.415e-01 -0.145 0.88460   
factorData2000-10-01 -2.198e-02 2.376e-01 -0.093 0.92632   
factorData2001-01-01 5.188e-02 2.458e-01 0.211 0.83289   
factorData2001-04-01 1.452e-02 2.541e-01 0.057 0.95444   
factorData2001-07-01 1.135e-01 2.367e-01 0.479 0.63182   
factorData2001-10-01 7.113e-02 2.464e-01 0.289 0.77289   
factorData2002-01-01 1.373e-01 2.447e-01 0.561 0.57502   
factorData2002-04-01 2.324e-01 2.459e-01 0.945 0.34483   
factorData2002-07-01 2.405e-01 2.349e-01 1.024 0.30628   
factorData2002-10-01 8.665e-02 2.431e-01 0.356 0.72165   
factorData2003-01-01 1.359e-01 2.453e-01 0.554 0.57971   
factorData2003-04-01 -7.534e-02 2.777e-01 -0.271 0.78623   
factorData2003-07-01 -1.750e-02 2.430e-01 -0.072 0.94260   
factorData2003-10-01 -2.078e-02 2.404e-01 -0.086 0.93114   
factorData2004-01-01 -2.436e-02 2.450e-01 -0.099 0.92082   
factorData2004-04-01 -9.006e-02 2.512e-01 -0.359 0.72004   
factorData2004-07-01 -1.543e-01 2.444e-01 -0.631 0.52805   
factorData2004-10-01 -1.602e-01 2.419e-01 -0.662 0.50817   
factorData2005-01-01 -2.125e-02 2.455e-01 -0.087 0.93106   
factorData2005-04-01 -1.422e-01 2.725e-01 -0.522 0.60194   
factorData2005-07-01 -9.434e-02 2.429e-01 -0.388 0.69783   
factorData2005-10-01 -1.769e-02 2.399e-01 -0.074 0.94125   
factorData2006-01-01 6.835e-02 2.455e-01 0.278 0.78082   
factorData2006-04-01 -1.122e-01 2.592e-01 -0.433 0.66520   
factorData2006-07-01 -7.609e-02 2.520e-01 -0.302 0.76282   
factorData2006-10-01 3.609e-03 2.382e-01 0.015 0.98791   
factorData2007-01-01 8.259e-02 2.449e-01 0.337 0.73606   
factorData2007-04-01 4.625e-01 2.638e-01 1.753 0.08008 .   
factorData2007-07-01 2.581e-04 2.421e-01 0.001 0.99915   
factorData2007-10-01 -3.134e-01 2.375e-01 -1.320 0.18740   
factorData2008-01-01 -1.346e-01 2.455e-01 -0.548 0.58374   
factorData2008-04-01 -2.376e-01 2.715e-01 -0.875 0.38193   
factorData2008-07-01 -1.278e-01 2.363e-01 -0.541 0.58877   
factorData2008-10-01 4.639e-02 2.348e-01 0.198 0.84342   
factorData2009-01-01 8.040e-02 2.457e-01 0.327 0.74360   
factorData2009-04-01 -6.002e-02 2.770e-01 -0.217 0.82856   
factorData2009-07-01 -7.946e-02 2.472e-01 -0.321 0.74804   
factorData2009-10-01 -5.627e-02 2.392e-01 -0.235 0.81412   
factorData2010-01-01 -1.018e-01 2.464e-01 -0.413 0.67973   
factorData2010-04-01 -2.054e-01 2.561e-01 -0.802 0.42288   
factorData2010-07-01 -2.485e-01 2.443e-01 -1.017 0.30956   
factorData2010-10-01 -2.228e-01 2.403e-01 -0.927 0.35421   
factorData2011-01-01 -1.730e-01 2.469e-01 -0.701 0.48368   
factorData2011-04-01 -2.507e-01 2.611e-01 -0.960 0.33736   
factorData2011-07-01 -2.022e-01 2.381e-01 -0.849 0.39594   
factorData2011-10-01 -2.160e-01 2.384e-01 -0.906 0.36525   
factorData2012-01-01 -1.064e-01 2.470e-01 -0.431 0.66678   
factorData2012-04-01 -1.661e-01 2.507e-01 -0.663 0.50780   
factorData2012-07-01 -1.636e-01 2.422e-01 -0.675 0.49961   
factorData2012-10-01 -1.493e-01 2.403e-01 -0.621 0.53463   
factorData2013-01-01 -1.001e-01 2.471e-01 -0.405 0.68558   
factorData2013-04-01 -2.151e-01 2.493e-01 -0.863 0.38861   
factorData2013-07-01 -1.357e-01 2.428e-01 -0.559 0.57646   
factorData2013-10-01 -1.384e-01 2.399e-01 -0.577 0.56411   
factorData2014-01-01 -9.867e-02 2.470e-01 -0.399 0.68971   
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Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Residual standard error: 0.5732 on 622 degrees of freedom  
Multiple R-squared: 0.07765, Adjusted R-squared: -0.01281   
F-statistic: 0.8584 on 61 and 622 DF, p-value: 0.7688



## c. Usando apenas as variáveis principais, dummies de trimestre e dummies de firma.

Call:  
lm(formula = alavancagem ~ log\_tamanhoEmpresa + imobilizado +   
 retornoSobreAtivo + qDeTobin + crescimento + factorData +   
 nome\_companhia, data = Base\_2023)  
  
Residuals:  
 Min 1Q Median 3Q Max   
-2.8223 -0.1579 -0.0117 0.1281 6.7653   
  
Coefficients:  
 Estimate Std. Error t value Pr(>|t|)   
(Intercept) 1.391e+00 1.520e-01 9.154 < 2e-16 \*\*\*  
log\_tamanhoEmpresa -1.166e-08 6.206e-09 -1.879 0.060721 .   
imobilizado 3.974e-02 1.394e-01 0.285 0.775728   
retornoSobreAtivo -8.254e-01 3.612e-01 -2.285 0.022628 \*   
qDeTobin -6.845e-04 1.388e-04 -4.932 1.05e-06 \*\*\*  
crescimento 7.997e-04 7.732e-04 1.034 0.301456   
factorData2000-04-01 -8.747e-02 1.954e-01 -0.448 0.654520   
factorData2000-07-01 -2.203e-02 1.845e-01 -0.119 0.905002   
factorData2000-10-01 7.298e-03 1.815e-01 0.040 0.967946   
factorData2001-01-01 8.350e-02 1.882e-01 0.444 0.657416   
factorData2001-04-01 5.020e-03 1.945e-01 0.026 0.979421   
factorData2001-07-01 1.468e-01 1.808e-01 0.812 0.417176   
factorData2001-10-01 9.688e-02 1.883e-01 0.514 0.607117   
factorData2002-01-01 1.589e-01 1.872e-01 0.849 0.396296   
factorData2002-04-01 2.173e-01 1.881e-01 1.155 0.248339   
factorData2002-07-01 2.947e-01 1.797e-01 1.640 0.101490   
factorData2002-10-01 1.892e-01 1.865e-01 1.015 0.310722   
factorData2003-01-01 2.384e-01 1.883e-01 1.266 0.205917   
factorData2003-04-01 -3.054e-02 2.133e-01 -0.143 0.886211   
factorData2003-07-01 8.100e-02 1.861e-01 0.435 0.663612   
factorData2003-10-01 1.025e-01 1.843e-01 0.556 0.578364   
factorData2004-01-01 1.069e-01 1.885e-01 0.567 0.570640   
factorData2004-04-01 1.315e-02 1.932e-01 0.068 0.945749   
factorData2004-07-01 -3.783e-02 1.875e-01 -0.202 0.840209   
factorData2004-10-01 -2.463e-02 1.856e-01 -0.133 0.894435   
factorData2005-01-01 8.804e-02 1.884e-01 0.467 0.640502   
factorData2005-04-01 -8.381e-02 2.092e-01 -0.401 0.688851   
factorData2005-07-01 6.441e-03 1.860e-01 0.035 0.972392   
factorData2005-10-01 1.128e-01 1.839e-01 0.613 0.540108   
factorData2006-01-01 1.584e-01 1.883e-01 0.841 0.400519   
factorData2006-04-01 -6.464e-02 1.987e-01 -0.325 0.745104   
factorData2006-07-01 -1.630e-02 1.931e-01 -0.084 0.932752   
factorData2006-10-01 1.036e-01 1.824e-01 0.568 0.570132   
factorData2007-01-01 1.733e-01 1.880e-01 0.922 0.356980   
factorData2007-04-01 4.949e-01 2.024e-01 2.445 0.014781 \*   
factorData2007-07-01 6.677e-02 1.855e-01 0.360 0.718992   
factorData2007-10-01 -2.403e-01 1.821e-01 -1.319 0.187543   
factorData2008-01-01 -6.367e-02 1.887e-01 -0.337 0.735873   
factorData2008-04-01 -2.233e-01 2.089e-01 -1.069 0.285643   
factorData2008-07-01 -5.711e-02 1.811e-01 -0.315 0.752657   
factorData2008-10-01 1.387e-01 1.799e-01 0.771 0.440744   
factorData2009-01-01 1.664e-01 1.886e-01 0.882 0.377973   
factorData2009-04-01 -3.431e-02 2.131e-01 -0.161 0.872105   
factorData2009-07-01 8.491e-03 1.902e-01 0.045 0.964405   
factorData2009-10-01 5.924e-02 1.843e-01 0.321 0.748016   
factorData2010-01-01 -1.523e-03 1.911e-01 -0.008 0.993643   
factorData2010-04-01 -1.404e-01 1.983e-01 -0.708 0.479009   
factorData2010-07-01 -1.422e-01 1.895e-01 -0.750 0.453261   
factorData2010-10-01 -8.871e-02 1.871e-01 -0.474 0.635634   
factorData2011-01-01 -7.661e-02 1.923e-01 -0.398 0.690476   
factorData2011-04-01 -1.909e-01 2.033e-01 -0.939 0.348116   
factorData2011-07-01 -9.451e-02 1.849e-01 -0.511 0.609528   
factorData2011-10-01 -1.089e-01 1.859e-01 -0.586 0.558162   
factorData2012-01-01 -8.759e-03 1.928e-01 -0.045 0.963770   
factorData2012-04-01 -1.058e-01 1.950e-01 -0.543 0.587512   
factorData2012-07-01 -5.986e-02 1.884e-01 -0.318 0.750781   
factorData2012-10-01 -1.693e-02 1.875e-01 -0.090 0.928119   
factorData2013-01-01 -9.465e-03 1.927e-01 -0.049 0.960831   
factorData2013-04-01 -1.397e-01 1.938e-01 -0.721 0.471275   
factorData2013-07-01 -1.786e-02 1.891e-01 -0.094 0.924786   
factorData2013-10-01 4.986e-03 1.874e-01 0.027 0.978789   
factorData2014-01-01 -1.112e-02 1.928e-01 -0.058 0.954028   
nome\_companhiaAlpargata -1.264e+00 8.755e-02 -14.434 < 2e-16 \*\*\*  
nome\_companhiaAmbev -7.846e-01 1.150e-01 -6.822 2.17e-11 \*\*\*  
nome\_companhiaAmpla 5.731e-01 2.504e-01 2.288 0.022449 \*   
nome\_companhiaBRF SA ON -6.932e-01 8.430e-02 -8.224 1.19e-15 \*\*\*  
nome\_companhiaCasan -1.245e+00 9.554e-02 -13.034 < 2e-16 \*\*\*  
nome\_companhiaCedro -1.086e+00 8.762e-02 -12.400 < 2e-16 \*\*\*  
nome\_companhiaCesp -7.645e-01 1.067e-01 -7.165 2.26e-12 \*\*\*  
nome\_companhiaCoelce -9.054e-01 8.504e-02 -10.647 < 2e-16 \*\*\*  
nome\_companhiaConst A Lind -1.287e+00 9.960e-02 -12.921 < 2e-16 \*\*\*  
nome\_companhiaGafisa -8.777e-01 9.844e-02 -8.917 < 2e-16 \*\*\*  
nome\_companhiaKlabin -3.185e-01 8.356e-02 -3.812 0.000152 \*\*\*  
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Residual standard error: 0.4375 on 611 degrees of freedom  
Multiple R-squared: 0.472, Adjusted R-squared: 0.4098   
F-statistic: 7.587 on 72 and 611 DF, p-value: < 2.2e-16



# 3) Faça uma regressão usando efeitos aleatórios e erros robustos:

OBS: o “ROA” foi utilizado ao invés do “retornoSobreAtivo”, devido a problemas de convergência para a estimativa dos erros robustos. Provávelmente, isso acontece por conta dos valores extremos que o “retornoSobreAtivo” apresenta.

## a. Usando apenas as variáveis principais.

Oneway (individual) effect Random Effect Model   
 (Swamy-Arora's transformation)  
  
Call:  
plm(formula = alavancagem ~ log\_tamanhoEmpresa + imobilizado +   
 ROA + qDeTobin + crescimento, data = pdata, effect = "individual",   
 model = "random", random.method = "swar")  
  
Balanced Panel: n = 12, T = 57, N = 684  
  
Effects:  
 var std.dev share  
idiosyncratic 0.1909 0.4369 0.471  
individual 0.2147 0.4634 0.529  
theta: 0.8761  
  
Residuals:  
 Min. 1st Qu. Median 3rd Qu. Max.   
-3.082373 -0.160382 -0.035505 0.113492 7.256371   
  
Coefficients:  
 Estimate Std. Error z-value Pr(>|z|)   
(Intercept) 6.1482e-01 1.4484e-01 4.2447 2.188e-05 \*\*\*  
log\_tamanhoEmpresa -2.2296e-08 4.8750e-09 -4.5735 4.795e-06 \*\*\*  
imobilizado 2.0998e-01 1.1820e-01 1.7765 0.07564 .   
ROA -1.2560e-01 2.9753e-01 -0.4221 0.67293   
qDeTobin -4.6637e-04 1.1954e-04 -3.9015 9.561e-05 \*\*\*  
crescimento 1.8956e-04 2.3313e-04 0.8131 0.41615   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Total Sum of Squares: 137.39  
Residual Sum of Squares: 129.81  
R-Squared: 0.055185  
Adj. R-Squared: 0.048218  
Chisq: 39.601 on 5 DF, p-value: 1.7972e-07

t test of coefficients:  
  
 Estimate Std. Error t value Pr(>|t|)   
(Intercept) 6.1482e-01 1.3786e-01 4.4599 9.596e-06 \*\*\*  
log\_tamanhoEmpresa -2.2296e-08 5.1160e-09 -4.3581 1.515e-05 \*\*\*  
imobilizado 2.0998e-01 1.6680e-01 1.2589 0.2085   
ROA -1.2560e-01 9.2972e-01 -0.1351 0.8926   
qDeTobin -4.6637e-04 4.0631e-05 -11.4783 < 2.2e-16 \*\*\*  
crescimento 1.8956e-04 1.4781e-04 1.2825 0.2001   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

## b. Usando apenas as variáveis principais e os dummies de trimestre

OBS: aqui, o “retornoSobreAtivo” foi utilizado no lugar do ROA, mas o “tamanhoEmpresa” teve que ser removido devido a problemas de convergência para a estimativa dos erros robustos.

Oneway (individual) effect Random Effect Model   
 (Swamy-Arora's transformation)  
  
Call:  
plm(formula = alavancagem ~ imobilizado + retornoSobreAtivo +   
 qDeTobin + crescimento + factorData, data = pdata, effect = "individual",   
 model = "random", random.method = "swar")  
  
Balanced Panel: n = 12, T = 57, N = 684  
  
Effects:  
 var std.dev share  
idiosyncratic 0.1922 0.4384 0.52  
individual 0.1774 0.4212 0.48  
theta: 0.8634  
  
Residuals:  
 Min. 1st Qu. Median 3rd Qu. Max.   
-2.889840 -0.180450 -0.036639 0.133652 6.691018   
  
Coefficients:  
 Estimate Std. Error z-value Pr(>|z|)   
(Intercept) 0.65021220 0.18607934 3.4943 0.0004754 \*\*\*  
imobilizado -0.01280168 0.13295065 -0.0963 0.9232911   
retornoSobreAtivo -0.76801246 0.36220715 -2.1204 0.0339750 \*   
qDeTobin -0.00051267 0.00012297 -4.1692 3.057e-05 \*\*\*  
crescimento 0.00071880 0.00077755 0.9244 0.3552589   
factorData2000-04-01 -0.07723107 0.19663832 -0.3928 0.6944990   
factorData2000-07-01 -0.02099197 0.18575527 -0.1130 0.9100236   
factorData2000-10-01 0.01042167 0.18272449 0.0570 0.9545174   
factorData2001-01-01 0.07966932 0.18941567 0.4206 0.6740430   
factorData2001-04-01 0.01562661 0.19575669 0.0798 0.9363751   
factorData2001-07-01 0.14926963 0.18194260 0.8204 0.4119758   
factorData2001-10-01 0.10280750 0.18955427 0.5424 0.5875675   
factorData2002-01-01 0.15525609 0.18846276 0.8238 0.4100518   
factorData2002-04-01 0.22497439 0.18928051 1.1886 0.2346063   
factorData2002-07-01 0.28870662 0.18073777 1.5974 0.1101814   
factorData2002-10-01 0.17818545 0.18746521 0.9505 0.3418589   
factorData2003-01-01 0.21841562 0.18937723 1.1533 0.2487724   
factorData2003-04-01 -0.03182273 0.21461032 -0.1483 0.8821206   
factorData2003-07-01 0.07115782 0.18726315 0.3800 0.7039540   
factorData2003-10-01 0.09036847 0.18538783 0.4875 0.6259350   
factorData2004-01-01 0.07974890 0.18947690 0.4209 0.6738355   
factorData2004-04-01 -0.00340602 0.19419110 -0.0175 0.9860062   
factorData2004-07-01 -0.05959472 0.18862235 -0.3159 0.7520425   
factorData2004-10-01 -0.04827298 0.18664684 -0.2586 0.7959186   
factorData2005-01-01 0.05939756 0.18950202 0.3134 0.7539462   
factorData2005-04-01 -0.09640932 0.21052052 -0.4580 0.6469834   
factorData2005-07-01 -0.01565804 0.18714658 -0.0837 0.9333210   
factorData2005-10-01 0.08767112 0.18502142 0.4738 0.6356118   
factorData2006-01-01 0.12737247 0.18926930 0.6730 0.5009667   
factorData2006-04-01 -0.08288037 0.19992244 -0.4146 0.6784621   
factorData2006-07-01 -0.03687525 0.19420030 -0.1899 0.8494012   
factorData2006-10-01 0.07476688 0.18332558 0.4078 0.6833936   
factorData2007-01-01 0.13677033 0.18870959 0.7248 0.4685955   
factorData2007-04-01 0.47470824 0.20348756 2.3329 0.0196554 \*   
factorData2007-07-01 0.03836060 0.18620289 0.2060 0.8367791   
factorData2007-10-01 -0.27154064 0.18259047 -1.4872 0.1369734   
factorData2008-01-01 -0.10364161 0.18883830 -0.5488 0.5831167   
factorData2008-04-01 -0.24989113 0.20951564 -1.1927 0.2329835   
factorData2008-07-01 -0.08896131 0.18164623 -0.4898 0.6243105   
factorData2008-10-01 0.10598359 0.18060256 0.5868 0.5573157   
factorData2009-01-01 0.12786157 0.18920743 0.6758 0.4991838   
factorData2009-04-01 -0.05910678 0.21394944 -0.2763 0.7823444   
factorData2009-07-01 -0.03455347 0.19008010 -0.1818 0.8557524   
factorData2009-10-01 0.00986350 0.18380930 0.0537 0.9572048   
factorData2010-01-01 -0.06599165 0.18959145 -0.3481 0.7277854   
factorData2010-04-01 -0.19258584 0.19748712 -0.9752 0.3294701   
factorData2010-07-01 -0.20248481 0.18804373 -1.0768 0.2815712   
factorData2010-10-01 -0.15561608 0.18523337 -0.8401 0.4008477   
factorData2011-01-01 -0.14872552 0.18982549 -0.7835 0.4333421   
factorData2011-04-01 -0.25500811 0.20119748 -1.2675 0.2049938   
factorData2011-07-01 -0.15700175 0.18336801 -0.8562 0.3918810   
factorData2011-10-01 -0.17401197 0.18409307 -0.9452 0.3445368   
factorData2012-01-01 -0.08051180 0.19046900 -0.4227 0.6725120   
factorData2012-04-01 -0.16174792 0.19375489 -0.8348 0.4038264   
factorData2012-07-01 -0.12009418 0.18705969 -0.6420 0.5208667   
factorData2012-10-01 -0.08230659 0.18582434 -0.4429 0.6578186   
factorData2013-01-01 -0.07640655 0.19071653 -0.4006 0.6886934   
factorData2013-04-01 -0.19467821 0.19293650 -1.0090 0.3129615   
factorData2013-07-01 -0.07687673 0.18808351 -0.4087 0.6827325   
factorData2013-10-01 -0.06078089 0.18590963 -0.3269 0.7437149   
factorData2014-01-01 -0.07994184 0.19070576 -0.4192 0.6750777   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Total Sum of Squares: 137.68  
Residual Sum of Squares: 120.85  
R-Squared: 0.12218  
Adj. R-Squared: 0.037643  
Chisq: 86.7162 on 60 DF, p-value: 0.013623

t test of coefficients:  
  
 Estimate Std. Error t value Pr(>|t|)   
(Intercept) 6.5021e-01 1.9833e-01 3.2784 0.001102 \*\*   
imobilizado -1.2802e-02 1.8928e-01 -0.0676 0.946100   
retornoSobreAtivo -7.6801e-01 7.8696e-01 -0.9759 0.329478   
qDeTobin -5.1267e-04 8.2401e-05 -6.2216 9.03e-10 \*\*\*  
crescimento 7.1880e-04 3.5598e-04 2.0192 0.043895 \*   
factorData2000-04-01 -7.7231e-02 4.6003e-02 -1.6788 0.093685 .   
factorData2000-07-01 -2.0992e-02 8.3438e-02 -0.2516 0.801443   
factorData2000-10-01 1.0422e-02 1.1206e-01 0.0930 0.925931   
factorData2001-01-01 7.9669e-02 1.1224e-01 0.7098 0.478068   
factorData2001-04-01 1.5627e-02 1.2492e-01 0.1251 0.900487   
factorData2001-07-01 1.4927e-01 9.0506e-02 1.6493 0.099596 .   
factorData2001-10-01 1.0281e-01 1.1749e-01 0.8750 0.381897   
factorData2002-01-01 1.5526e-01 9.6283e-02 1.6125 0.107359   
factorData2002-04-01 2.2497e-01 1.1639e-01 1.9330 0.053690 .   
factorData2002-07-01 2.8871e-01 1.6051e-01 1.7987 0.072549 .   
factorData2002-10-01 1.7819e-01 1.4832e-01 1.2014 0.230056   
factorData2003-01-01 2.1842e-01 1.2900e-01 1.6931 0.090933 .   
factorData2003-04-01 -3.1823e-02 1.4825e-01 -0.2147 0.830101   
factorData2003-07-01 7.1158e-02 1.6062e-01 0.4430 0.657915   
factorData2003-10-01 9.0368e-02 1.6190e-01 0.5582 0.576924   
factorData2004-01-01 7.9749e-02 1.3430e-01 0.5938 0.552857   
factorData2004-04-01 -3.4060e-03 1.3795e-01 -0.0247 0.980309   
factorData2004-07-01 -5.9595e-02 1.2030e-01 -0.4954 0.620514   
factorData2004-10-01 -4.8273e-02 1.2523e-01 -0.3855 0.700012   
factorData2005-01-01 5.9398e-02 1.5715e-01 0.3780 0.705577   
factorData2005-04-01 -9.6409e-02 1.0949e-01 -0.8805 0.378929   
factorData2005-07-01 -1.5658e-02 1.0430e-01 -0.1501 0.880711   
factorData2005-10-01 8.7671e-02 1.2101e-01 0.7245 0.469049   
factorData2006-01-01 1.2737e-01 1.5426e-01 0.8257 0.409298   
factorData2006-04-01 -8.2880e-02 1.1075e-01 -0.7483 0.454541   
factorData2006-07-01 -3.6875e-02 1.1511e-01 -0.3204 0.748810   
factorData2006-10-01 7.4767e-02 1.1173e-01 0.6692 0.503614   
factorData2007-01-01 1.3677e-01 1.8252e-01 0.7493 0.453934   
factorData2007-04-01 4.7471e-01 5.8183e-01 0.8159 0.414879   
factorData2007-07-01 3.8361e-02 1.4412e-01 0.2662 0.790192   
factorData2007-10-01 -2.7154e-01 3.1122e-01 -0.8725 0.383266   
factorData2008-01-01 -1.0364e-01 1.8237e-01 -0.5683 0.570030   
factorData2008-04-01 -2.4989e-01 2.1522e-01 -1.1611 0.246055   
factorData2008-07-01 -8.8961e-02 2.1175e-01 -0.4201 0.674533   
factorData2008-10-01 1.0598e-01 1.6262e-01 0.6517 0.514814   
factorData2009-01-01 1.2786e-01 1.3678e-01 0.9348 0.350246   
factorData2009-04-01 -5.9107e-02 1.6975e-01 -0.3482 0.727808   
factorData2009-07-01 -3.4553e-02 1.8535e-01 -0.1864 0.852175   
factorData2009-10-01 9.8635e-03 1.5916e-01 0.0620 0.950604   
factorData2010-01-01 -6.5992e-02 1.1484e-01 -0.5746 0.565749   
factorData2010-04-01 -1.9259e-01 1.2552e-01 -1.5344 0.125451   
factorData2010-07-01 -2.0248e-01 1.2821e-01 -1.5793 0.114764   
factorData2010-10-01 -1.5562e-01 1.4304e-01 -1.0879 0.277049   
factorData2011-01-01 -1.4873e-01 1.3334e-01 -1.1154 0.265119   
factorData2011-04-01 -2.5501e-01 1.5178e-01 -1.6802 0.093426 .   
factorData2011-07-01 -1.5700e-01 1.4070e-01 -1.1159 0.264915   
factorData2011-10-01 -1.7401e-01 1.2588e-01 -1.3824 0.167346   
factorData2012-01-01 -8.0512e-02 1.6043e-01 -0.5018 0.615952   
factorData2012-04-01 -1.6175e-01 1.3850e-01 -1.1679 0.243296   
factorData2012-07-01 -1.2009e-01 1.4561e-01 -0.8247 0.409834   
factorData2012-10-01 -8.2307e-02 1.6764e-01 -0.4910 0.623627   
factorData2013-01-01 -7.6407e-02 1.6348e-01 -0.4674 0.640399   
factorData2013-04-01 -1.9468e-01 1.8449e-01 -1.0552 0.291742   
factorData2013-07-01 -7.6877e-02 1.5802e-01 -0.4865 0.626778   
factorData2013-10-01 -6.0781e-02 1.3345e-01 -0.4554 0.648946   
factorData2014-01-01 -7.9942e-02 1.3758e-01 -0.5811 0.561398   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

## c. Usando apenas as variáveis principais, dummies de trimestre e dummies de firma.

OBS: aqui, o “retornoSobreAtivo” foi utilizado no lugar do ROA, mas o “tamanhoEmpresa” teve que ser removido devido a problemas de convergência para a estimativa dos erros robustos.

Oneway (individual) effect Random Effect Model   
 (Amemiya's transformation)  
  
Call:  
plm(formula = alavancagem ~ imobilizado + retornoSobreAtivo +   
 qDeTobin + crescimento + factorData + nome\_companhia, data = pdata,   
 effect = "individual", model = "random", random.method = "amemiya")  
  
Balanced Panel: n = 12, T = 57, N = 684  
  
Effects:  
 var std.dev share  
idiosyncratic 0.1751 0.4184 0.38  
individual 0.2854 0.5342 0.62  
theta: 0.8968  
  
Residuals:  
 Min. 1st Qu. Median 3rd Qu. Max.   
-2.822899 -0.170185 -0.027072 0.136214 6.761902   
  
Coefficients:  
 Estimate Std. Error z-value Pr(>|z|)   
(Intercept) 1.39249219 0.58015892 2.4002 0.01639 \*   
imobilizado -0.01013639 0.13717615 -0.0739 0.94110   
retornoSobreAtivo -0.83520857 0.36186007 -2.3081 0.02099 \*   
qDeTobin -0.00070216 0.00013876 -5.0601 4.191e-07 \*\*\*  
crescimento 0.00075373 0.00077445 0.9732 0.33044   
factorData2000-04-01 -0.08303035 0.19576100 -0.4241 0.67146   
factorData2000-07-01 -0.02069844 0.18490954 -0.1119 0.91087   
factorData2000-10-01 0.01068972 0.18189533 0.0588 0.95314   
factorData2001-01-01 0.08207680 0.18856867 0.4353 0.66337   
factorData2001-04-01 0.01310569 0.19487431 0.0673 0.94638   
factorData2001-07-01 0.15350878 0.18111626 0.8476 0.39668   
factorData2001-10-01 0.10188912 0.18869352 0.5400 0.58922   
factorData2002-01-01 0.15631423 0.18761155 0.8332 0.40474   
factorData2002-04-01 0.22358417 0.18842542 1.1866 0.23539   
factorData2002-07-01 0.30221574 0.17998232 1.6791 0.09312 .   
factorData2002-10-01 0.19949204 0.18675965 1.0682 0.28544   
factorData2003-01-01 0.24123027 0.18867753 1.2785 0.20106   
factorData2003-04-01 -0.02054950 0.21370453 -0.0962 0.92339   
factorData2003-07-01 0.08727170 0.18649719 0.4680 0.63982   
factorData2003-10-01 0.10827191 0.18464217 0.5864 0.55761   
factorData2004-01-01 0.10789796 0.18885823 0.5713 0.56778   
factorData2004-04-01 0.02251842 0.19354305 0.1163 0.90738   
factorData2004-07-01 -0.03756545 0.18793309 -0.1999 0.84157   
factorData2004-10-01 -0.02698459 0.18594509 -0.1451 0.88462   
factorData2005-01-01 0.07897599 0.18876165 0.4184 0.67566   
factorData2005-04-01 -0.08607931 0.20962858 -0.4106 0.68135   
factorData2005-07-01 -0.00295227 0.18635782 -0.0158 0.98736   
factorData2005-10-01 0.10464011 0.18427650 0.5678 0.57014   
factorData2006-01-01 0.14131158 0.18847392 0.7498 0.45339   
factorData2006-04-01 -0.07579858 0.19905452 -0.3808 0.70336   
factorData2006-07-01 -0.03046074 0.19335083 -0.1575 0.87482   
factorData2006-10-01 0.08520817 0.18253449 0.4668 0.64064   
factorData2007-01-01 0.14785968 0.18789800 0.7869 0.43133   
factorData2007-04-01 0.47556356 0.20258823 2.3474 0.01890 \*   
factorData2007-07-01 0.04082489 0.18536725 0.2202 0.82569   
factorData2007-10-01 -0.27076785 0.18176562 -1.4897 0.13632   
factorData2008-01-01 -0.10125584 0.18798581 -0.5386 0.59014   
factorData2008-04-01 -0.25646067 0.20859959 -1.2294 0.21891   
factorData2008-07-01 -0.08682462 0.18082679 -0.4802 0.63112   
factorData2008-10-01 0.11615426 0.17982158 0.6459 0.51832   
factorData2009-01-01 0.13731723 0.18838094 0.7289 0.46604   
factorData2009-04-01 -0.06122104 0.21301227 -0.2874 0.77380   
factorData2009-07-01 -0.03410708 0.18922894 -0.1802 0.85696   
factorData2009-10-01 0.01221645 0.18298137 0.0668 0.94677   
factorData2010-01-01 -0.06188776 0.18877547 -0.3278 0.74303   
factorData2010-04-01 -0.19314553 0.19666627 -0.9821 0.32605   
factorData2010-07-01 -0.20093937 0.18725095 -1.0731 0.28323   
factorData2010-10-01 -0.15193059 0.18447162 -0.8236 0.41017   
factorData2011-01-01 -0.14687259 0.18901480 -0.7770 0.43713   
factorData2011-04-01 -0.25930835 0.20038182 -1.2941 0.19564   
factorData2011-07-01 -0.15377232 0.18261703 -0.8420 0.39976   
factorData2011-10-01 -0.17040574 0.18338440 -0.9292 0.35277   
factorData2012-01-01 -0.07700056 0.18970202 -0.4059 0.68481   
factorData2012-04-01 -0.16245635 0.19300688 -0.8417 0.39995   
factorData2012-07-01 -0.11673663 0.18633208 -0.6265 0.53099   
factorData2012-10-01 -0.07774455 0.18510646 -0.4200 0.67449   
factorData2013-01-01 -0.07423814 0.18993986 -0.3909 0.69591   
factorData2013-04-01 -0.19222369 0.19221532 -1.0000 0.31729   
factorData2013-07-01 -0.07111120 0.18738655 -0.3795 0.70432   
factorData2013-10-01 -0.05344665 0.18522482 -0.2886 0.77293   
factorData2014-01-01 -0.07727828 0.18994816 -0.4068 0.68413   
nome\_companhiaAlpargata -1.23643706 0.79640210 -1.5525 0.12054   
nome\_companhiaAmbev -0.92613262 0.79646764 -1.1628 0.24491   
nome\_companhiaAmpla 0.62071101 0.83012395 0.7477 0.45462   
nome\_companhiaBRF SA ON -0.72578964 0.79599304 -0.9118 0.36187   
nome\_companhiaCasan -1.19472625 0.79700016 -1.4990 0.13387   
nome\_companhiaCedro -1.03768535 0.79611783 -1.3034 0.19243   
nome\_companhiaCesp -0.79886190 0.79866803 -1.0002 0.31719   
nome\_companhiaCoelce -0.87147034 0.79605579 -1.0947 0.27363   
nome\_companhiaConst A Lind -1.25990084 0.79782494 -1.5792 0.11430   
nome\_companhiaGafisa -0.87614952 0.79780977 -1.0982 0.27212   
nome\_companhiaKlabin -0.31345463 0.79609958 -0.3937 0.69377   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Total Sum of Squares: 136.99  
Residual Sum of Squares: 117.64  
R-Squared: 0.14128  
Adj. R-Squared: 0.041662  
Chisq: 100.692 on 71 DF, p-value: 0.011769

t test of coefficients:  
  
 Estimate Std. Error t value Pr(>|t|)   
(Intercept) 1.39249219 0.10653095 13.0712 < 2.2e-16 \*\*\*  
imobilizado -0.01013639 0.19729823 -0.0514 0.9590427   
retornoSobreAtivo -0.83520857 0.80694548 -1.0350 0.3010661   
qDeTobin -0.00070216 0.00010880 -6.4536 2.223e-10 \*\*\*  
crescimento 0.00075373 0.00036279 2.0776 0.0381624 \*   
factorData2000-04-01 -0.08303035 0.04761571 -1.7438 0.0817032 .   
factorData2000-07-01 -0.02069844 0.08439972 -0.2452 0.8063505   
factorData2000-10-01 0.01068972 0.11234824 0.0951 0.9242283   
factorData2001-01-01 0.08207680 0.11075192 0.7411 0.4589250   
factorData2001-04-01 0.01310569 0.12649817 0.1036 0.9175177   
factorData2001-07-01 0.15350878 0.08961563 1.7130 0.0872247 .   
factorData2001-10-01 0.10188912 0.11936445 0.8536 0.3936624   
factorData2002-01-01 0.15631423 0.09603321 1.6277 0.1041011   
factorData2002-04-01 0.22358417 0.11882244 1.8817 0.0603557 .   
factorData2002-07-01 0.30221574 0.15238967 1.9832 0.0477942 \*   
factorData2002-10-01 0.19949204 0.14010669 1.4239 0.1549972   
factorData2003-01-01 0.24123027 0.11838316 2.0377 0.0420087 \*   
factorData2003-04-01 -0.02054950 0.14344941 -0.1433 0.8861379   
factorData2003-07-01 0.08727170 0.15630980 0.5583 0.5768265   
factorData2003-10-01 0.10827191 0.15537311 0.6969 0.4861606   
factorData2004-01-01 0.10789796 0.12121263 0.8902 0.3737327   
factorData2004-04-01 0.02251842 0.13081747 0.1721 0.8633874   
factorData2004-07-01 -0.03756545 0.11504225 -0.3265 0.7441304   
factorData2004-10-01 -0.02698459 0.11676169 -0.2311 0.8173079   
factorData2005-01-01 0.07897599 0.15260500 0.5175 0.6049809   
factorData2005-04-01 -0.08607931 0.10356026 -0.8312 0.4061847   
factorData2005-07-01 -0.00295227 0.09640611 -0.0306 0.9755800   
factorData2005-10-01 0.10464011 0.11455642 0.9134 0.3613723   
factorData2006-01-01 0.14131158 0.14838154 0.9524 0.3412941   
factorData2006-04-01 -0.07579858 0.10298077 -0.7360 0.4619848   
factorData2006-07-01 -0.03046074 0.11087435 -0.2747 0.7836148   
factorData2006-10-01 0.08520817 0.10442224 0.8160 0.4148197   
factorData2007-01-01 0.14785968 0.17816424 0.8299 0.4069152   
factorData2007-04-01 0.47556356 0.58438953 0.8138 0.4160884   
factorData2007-07-01 0.04082489 0.13912955 0.2934 0.7692924   
factorData2007-10-01 -0.27076785 0.31488544 -0.8599 0.3901846   
factorData2008-01-01 -0.10125584 0.18103844 -0.5593 0.5761577   
factorData2008-04-01 -0.25646067 0.21786908 -1.1771 0.2396004   
factorData2008-07-01 -0.08682462 0.21166971 -0.4102 0.6818107   
factorData2008-10-01 0.11615426 0.15868835 0.7320 0.4644704   
factorData2009-01-01 0.13731723 0.12718090 1.0797 0.2807011   
factorData2009-04-01 -0.06122104 0.16790713 -0.3646 0.7155266   
factorData2009-07-01 -0.03410708 0.18431054 -0.1851 0.8532494   
factorData2009-10-01 0.01221645 0.15856808 0.0770 0.9386151   
factorData2010-01-01 -0.06188776 0.10877609 -0.5689 0.5696013   
factorData2010-04-01 -0.19314553 0.12354237 -1.5634 0.1184766   
factorData2010-07-01 -0.20093937 0.12564235 -1.5993 0.1102708   
factorData2010-10-01 -0.15193059 0.14063823 -1.0803 0.2804369   
factorData2011-01-01 -0.14687259 0.12803562 -1.1471 0.2517791   
factorData2011-04-01 -0.25930835 0.15120318 -1.7150 0.0868576 .   
factorData2011-07-01 -0.15377232 0.13814862 -1.1131 0.2661053   
factorData2011-10-01 -0.17040574 0.12247229 -1.3914 0.1646152   
factorData2012-01-01 -0.07700056 0.15595841 -0.4937 0.6216776   
factorData2012-04-01 -0.16245635 0.13704428 -1.1854 0.2363077   
factorData2012-07-01 -0.11673663 0.14400734 -0.8106 0.4178935   
factorData2012-10-01 -0.07774455 0.16566682 -0.4693 0.6390348   
factorData2013-01-01 -0.07423814 0.15974142 -0.4647 0.6422834   
factorData2013-04-01 -0.19222369 0.18308103 -1.0499 0.2941611   
factorData2013-07-01 -0.07111120 0.15367108 -0.4627 0.6437085   
factorData2013-10-01 -0.05344665 0.12847170 -0.4160 0.6775420   
factorData2014-01-01 -0.07727828 0.13107500 -0.5896 0.5556946   
nome\_companhiaAlpargata -1.23643706 0.04381527 -28.2193 < 2.2e-16 \*\*\*  
nome\_companhiaAmbev -0.92613262 0.05882321 -15.7443 < 2.2e-16 \*\*\*  
nome\_companhiaAmpla 0.62071101 0.17739415 3.4991 0.0005008 \*\*\*  
nome\_companhiaBRF SA ON -0.72578964 0.01261138 -57.5504 < 2.2e-16 \*\*\*  
nome\_companhiaCasan -1.19472625 0.07041577 -16.9667 < 2.2e-16 \*\*\*  
nome\_companhiaCedro -1.03768535 0.02870933 -36.1445 < 2.2e-16 \*\*\*  
nome\_companhiaCesp -0.79886190 0.10745167 -7.4346 3.554e-13 \*\*\*  
nome\_companhiaCoelce -0.87147034 0.01574980 -55.3321 < 2.2e-16 \*\*\*  
nome\_companhiaConst A Lind -1.25990084 0.07020237 -17.9467 < 2.2e-16 \*\*\*  
nome\_companhiaGafisa -0.87614952 0.07377638 -11.8757 < 2.2e-16 \*\*\*  
nome\_companhiaKlabin -0.31345463 0.01692139 -18.5242 < 2.2e-16 \*\*\*  
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

## d. Usando apenas as variáveis principais, dummies de trimestre, dummies de firma e cluster por firma.

OBS: aqui, o “retornoSobreAtivo” foi utilizado no lugar do ROA, mas o “tamanhoEmpresa” teve que ser removido devido a problemas de convergência para a estimativa dos erros robustos.

Oneway (individual) effect Random Effect Model   
 (Amemiya's transformation)  
  
Call:  
plm(formula = alavancagem ~ imobilizado + retornoSobreAtivo +   
 qDeTobin + crescimento + factorData + nome\_companhia, data = pdata,   
 effect = "individual", model = "random", random.method = "amemiya",   
 cluster = "nome\_companhia")  
  
Balanced Panel: n = 12, T = 57, N = 684  
  
Effects:  
 var std.dev share  
idiosyncratic 0.1751 0.4184 0.38  
individual 0.2854 0.5342 0.62  
theta: 0.8968  
  
Residuals:  
 Min. 1st Qu. Median 3rd Qu. Max.   
-2.822899 -0.170185 -0.027072 0.136214 6.761902   
  
Coefficients:  
 Estimate Std. Error z-value Pr(>|z|)   
(Intercept) 1.39249219 0.58015892 2.4002 0.01639 \*   
imobilizado -0.01013639 0.13717615 -0.0739 0.94110   
retornoSobreAtivo -0.83520857 0.36186007 -2.3081 0.02099 \*   
qDeTobin -0.00070216 0.00013876 -5.0601 4.191e-07 \*\*\*  
crescimento 0.00075373 0.00077445 0.9732 0.33044   
factorData2000-04-01 -0.08303035 0.19576100 -0.4241 0.67146   
factorData2000-07-01 -0.02069844 0.18490954 -0.1119 0.91087   
factorData2000-10-01 0.01068972 0.18189533 0.0588 0.95314   
factorData2001-01-01 0.08207680 0.18856867 0.4353 0.66337   
factorData2001-04-01 0.01310569 0.19487431 0.0673 0.94638   
factorData2001-07-01 0.15350878 0.18111626 0.8476 0.39668   
factorData2001-10-01 0.10188912 0.18869352 0.5400 0.58922   
factorData2002-01-01 0.15631423 0.18761155 0.8332 0.40474   
factorData2002-04-01 0.22358417 0.18842542 1.1866 0.23539   
factorData2002-07-01 0.30221574 0.17998232 1.6791 0.09312 .   
factorData2002-10-01 0.19949204 0.18675965 1.0682 0.28544   
factorData2003-01-01 0.24123027 0.18867753 1.2785 0.20106   
factorData2003-04-01 -0.02054950 0.21370453 -0.0962 0.92339   
factorData2003-07-01 0.08727170 0.18649719 0.4680 0.63982   
factorData2003-10-01 0.10827191 0.18464217 0.5864 0.55761   
factorData2004-01-01 0.10789796 0.18885823 0.5713 0.56778   
factorData2004-04-01 0.02251842 0.19354305 0.1163 0.90738   
factorData2004-07-01 -0.03756545 0.18793309 -0.1999 0.84157   
factorData2004-10-01 -0.02698459 0.18594509 -0.1451 0.88462   
factorData2005-01-01 0.07897599 0.18876165 0.4184 0.67566   
factorData2005-04-01 -0.08607931 0.20962858 -0.4106 0.68135   
factorData2005-07-01 -0.00295227 0.18635782 -0.0158 0.98736   
factorData2005-10-01 0.10464011 0.18427650 0.5678 0.57014   
factorData2006-01-01 0.14131158 0.18847392 0.7498 0.45339   
factorData2006-04-01 -0.07579858 0.19905452 -0.3808 0.70336   
factorData2006-07-01 -0.03046074 0.19335083 -0.1575 0.87482   
factorData2006-10-01 0.08520817 0.18253449 0.4668 0.64064   
factorData2007-01-01 0.14785968 0.18789800 0.7869 0.43133   
factorData2007-04-01 0.47556356 0.20258823 2.3474 0.01890 \*   
factorData2007-07-01 0.04082489 0.18536725 0.2202 0.82569   
factorData2007-10-01 -0.27076785 0.18176562 -1.4897 0.13632   
factorData2008-01-01 -0.10125584 0.18798581 -0.5386 0.59014   
factorData2008-04-01 -0.25646067 0.20859959 -1.2294 0.21891   
factorData2008-07-01 -0.08682462 0.18082679 -0.4802 0.63112   
factorData2008-10-01 0.11615426 0.17982158 0.6459 0.51832   
factorData2009-01-01 0.13731723 0.18838094 0.7289 0.46604   
factorData2009-04-01 -0.06122104 0.21301227 -0.2874 0.77380   
factorData2009-07-01 -0.03410708 0.18922894 -0.1802 0.85696   
factorData2009-10-01 0.01221645 0.18298137 0.0668 0.94677   
factorData2010-01-01 -0.06188776 0.18877547 -0.3278 0.74303   
factorData2010-04-01 -0.19314553 0.19666627 -0.9821 0.32605   
factorData2010-07-01 -0.20093937 0.18725095 -1.0731 0.28323   
factorData2010-10-01 -0.15193059 0.18447162 -0.8236 0.41017   
factorData2011-01-01 -0.14687259 0.18901480 -0.7770 0.43713   
factorData2011-04-01 -0.25930835 0.20038182 -1.2941 0.19564   
factorData2011-07-01 -0.15377232 0.18261703 -0.8420 0.39976   
factorData2011-10-01 -0.17040574 0.18338440 -0.9292 0.35277   
factorData2012-01-01 -0.07700056 0.18970202 -0.4059 0.68481   
factorData2012-04-01 -0.16245635 0.19300688 -0.8417 0.39995   
factorData2012-07-01 -0.11673663 0.18633208 -0.6265 0.53099   
factorData2012-10-01 -0.07774455 0.18510646 -0.4200 0.67449   
factorData2013-01-01 -0.07423814 0.18993986 -0.3909 0.69591   
factorData2013-04-01 -0.19222369 0.19221532 -1.0000 0.31729   
factorData2013-07-01 -0.07111120 0.18738655 -0.3795 0.70432   
factorData2013-10-01 -0.05344665 0.18522482 -0.2886 0.77293   
factorData2014-01-01 -0.07727828 0.18994816 -0.4068 0.68413   
nome\_companhiaAlpargata -1.23643706 0.79640210 -1.5525 0.12054   
nome\_companhiaAmbev -0.92613262 0.79646764 -1.1628 0.24491   
nome\_companhiaAmpla 0.62071101 0.83012395 0.7477 0.45462   
nome\_companhiaBRF SA ON -0.72578964 0.79599304 -0.9118 0.36187   
nome\_companhiaCasan -1.19472625 0.79700016 -1.4990 0.13387   
nome\_companhiaCedro -1.03768535 0.79611783 -1.3034 0.19243   
nome\_companhiaCesp -0.79886190 0.79866803 -1.0002 0.31719   
nome\_companhiaCoelce -0.87147034 0.79605579 -1.0947 0.27363   
nome\_companhiaConst A Lind -1.25990084 0.79782494 -1.5792 0.11430   
nome\_companhiaGafisa -0.87614952 0.79780977 -1.0982 0.27212   
nome\_companhiaKlabin -0.31345463 0.79609958 -0.3937 0.69377   
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
  
Total Sum of Squares: 136.99  
Residual Sum of Squares: 117.64  
R-Squared: 0.14128  
Adj. R-Squared: 0.041662  
Chisq: 100.692 on 71 DF, p-value: 0.011769

t test of coefficients:  
  
 Estimate Std. Error t value Pr(>|t|)   
(Intercept) 1.39249219 0.10653095 13.0712 < 2.2e-16 \*\*\*  
imobilizado -0.01013639 0.19729823 -0.0514 0.9590427   
retornoSobreAtivo -0.83520857 0.80694548 -1.0350 0.3010661   
qDeTobin -0.00070216 0.00010880 -6.4536 2.223e-10 \*\*\*  
crescimento 0.00075373 0.00036279 2.0776 0.0381624 \*   
factorData2000-04-01 -0.08303035 0.04761571 -1.7438 0.0817032 .   
factorData2000-07-01 -0.02069844 0.08439972 -0.2452 0.8063505   
factorData2000-10-01 0.01068972 0.11234824 0.0951 0.9242283   
factorData2001-01-01 0.08207680 0.11075192 0.7411 0.4589250   
factorData2001-04-01 0.01310569 0.12649817 0.1036 0.9175177   
factorData2001-07-01 0.15350878 0.08961563 1.7130 0.0872247 .   
factorData2001-10-01 0.10188912 0.11936445 0.8536 0.3936624   
factorData2002-01-01 0.15631423 0.09603321 1.6277 0.1041011   
factorData2002-04-01 0.22358417 0.11882244 1.8817 0.0603557 .   
factorData2002-07-01 0.30221574 0.15238967 1.9832 0.0477942 \*   
factorData2002-10-01 0.19949204 0.14010669 1.4239 0.1549972   
factorData2003-01-01 0.24123027 0.11838316 2.0377 0.0420087 \*   
factorData2003-04-01 -0.02054950 0.14344941 -0.1433 0.8861379   
factorData2003-07-01 0.08727170 0.15630980 0.5583 0.5768265   
factorData2003-10-01 0.10827191 0.15537311 0.6969 0.4861606   
factorData2004-01-01 0.10789796 0.12121263 0.8902 0.3737327   
factorData2004-04-01 0.02251842 0.13081747 0.1721 0.8633874   
factorData2004-07-01 -0.03756545 0.11504225 -0.3265 0.7441304   
factorData2004-10-01 -0.02698459 0.11676169 -0.2311 0.8173079   
factorData2005-01-01 0.07897599 0.15260500 0.5175 0.6049809   
factorData2005-04-01 -0.08607931 0.10356026 -0.8312 0.4061847   
factorData2005-07-01 -0.00295227 0.09640611 -0.0306 0.9755800   
factorData2005-10-01 0.10464011 0.11455642 0.9134 0.3613723   
factorData2006-01-01 0.14131158 0.14838154 0.9524 0.3412941   
factorData2006-04-01 -0.07579858 0.10298077 -0.7360 0.4619848   
factorData2006-07-01 -0.03046074 0.11087435 -0.2747 0.7836148   
factorData2006-10-01 0.08520817 0.10442224 0.8160 0.4148197   
factorData2007-01-01 0.14785968 0.17816424 0.8299 0.4069152   
factorData2007-04-01 0.47556356 0.58438953 0.8138 0.4160884   
factorData2007-07-01 0.04082489 0.13912955 0.2934 0.7692924   
factorData2007-10-01 -0.27076785 0.31488544 -0.8599 0.3901846   
factorData2008-01-01 -0.10125584 0.18103844 -0.5593 0.5761577   
factorData2008-04-01 -0.25646067 0.21786908 -1.1771 0.2396004   
factorData2008-07-01 -0.08682462 0.21166971 -0.4102 0.6818107   
factorData2008-10-01 0.11615426 0.15868835 0.7320 0.4644704   
factorData2009-01-01 0.13731723 0.12718090 1.0797 0.2807011   
factorData2009-04-01 -0.06122104 0.16790713 -0.3646 0.7155266   
factorData2009-07-01 -0.03410708 0.18431054 -0.1851 0.8532494   
factorData2009-10-01 0.01221645 0.15856808 0.0770 0.9386151   
factorData2010-01-01 -0.06188776 0.10877609 -0.5689 0.5696013   
factorData2010-04-01 -0.19314553 0.12354237 -1.5634 0.1184766   
factorData2010-07-01 -0.20093937 0.12564235 -1.5993 0.1102708   
factorData2010-10-01 -0.15193059 0.14063823 -1.0803 0.2804369   
factorData2011-01-01 -0.14687259 0.12803562 -1.1471 0.2517791   
factorData2011-04-01 -0.25930835 0.15120318 -1.7150 0.0868576 .   
factorData2011-07-01 -0.15377232 0.13814862 -1.1131 0.2661053   
factorData2011-10-01 -0.17040574 0.12247229 -1.3914 0.1646152   
factorData2012-01-01 -0.07700056 0.15595841 -0.4937 0.6216776   
factorData2012-04-01 -0.16245635 0.13704428 -1.1854 0.2363077   
factorData2012-07-01 -0.11673663 0.14400734 -0.8106 0.4178935   
factorData2012-10-01 -0.07774455 0.16566682 -0.4693 0.6390348   
factorData2013-01-01 -0.07423814 0.15974142 -0.4647 0.6422834   
factorData2013-04-01 -0.19222369 0.18308103 -1.0499 0.2941611   
factorData2013-07-01 -0.07111120 0.15367108 -0.4627 0.6437085   
factorData2013-10-01 -0.05344665 0.12847170 -0.4160 0.6775420   
factorData2014-01-01 -0.07727828 0.13107500 -0.5896 0.5556946   
nome\_companhiaAlpargata -1.23643706 0.04381527 -28.2193 < 2.2e-16 \*\*\*  
nome\_companhiaAmbev -0.92613262 0.05882321 -15.7443 < 2.2e-16 \*\*\*  
nome\_companhiaAmpla 0.62071101 0.17739415 3.4991 0.0005008 \*\*\*  
nome\_companhiaBRF SA ON -0.72578964 0.01261138 -57.5504 < 2.2e-16 \*\*\*  
nome\_companhiaCasan -1.19472625 0.07041577 -16.9667 < 2.2e-16 \*\*\*  
nome\_companhiaCedro -1.03768535 0.02870933 -36.1445 < 2.2e-16 \*\*\*  
nome\_companhiaCesp -0.79886190 0.10745167 -7.4346 3.554e-13 \*\*\*  
nome\_companhiaCoelce -0.87147034 0.01574980 -55.3321 < 2.2e-16 \*\*\*  
nome\_companhiaConst A Lind -1.25990084 0.07020237 -17.9467 < 2.2e-16 \*\*\*  
nome\_companhiaGafisa -0.87614952 0.07377638 -11.8757 < 2.2e-16 \*\*\*  
nome\_companhiaKlabin -0.31345463 0.01692139 -18.5242 < 2.2e-16 \*\*\*  
---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

# 4) Faça regressões usando efeitos fixos e erros robustos:

## a. Usando apenas as variáveis principais.

## b. Usando apenas as variáveis principais e os dummies de trimestre

## c. Usando apenas as variáveis principais, dummies de trimestre e dummies de firma.

## d. Usando apenas as variáveis principais, dummies de trimestre, dummies de firma e cluster por firma.

# 5) Execute um teste de Hausman para os modelos RE e FE usando o modelo da letra (a) e conclua qual seria a técnica indicada neste caso

# 6) Sinta-se à vontade para adicionar qualquer análise extra que desejar. Você pode tentar medidas alternativas de alavancagem; adicionar variáveis de controle adicionais que você acha que estão faltando (pode precisar de mais dados a serem baixados). Faça uma breve descrição de seus resultados, incluindo tabelas fáceis de ler de todos as estimativas e outros testes.

# 7) Faça breves comentários comparando as regressões. O que você conclui?