Aula T24 – Heterocedasticidade: testes e estimação robusta

1. Testes de heterocedasticidade

Equação 1: estimação OLS do modelo inicial

Dependent Variable: LWAGE
Included observations: 526

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.284360	0.104190	2.729230	0.0066
EDUC	0.092029	0.007330	12.55525	0.0000
EXPER	0.004121	0.001723	2.391437	0.0171
TENURE	0.022067	0.003094	7.133071	0.0000

R-squared	0.316013	Mean dependent var		1.623268
Adjusted R-squared	0.312082	S.D. dependent var		0.531538
S.E. of regression	0.440862	Akaike info criterion		1.207406
Sum squared resid	101.4556	Schwarz criterion		1.239842
Log likelihood	-313.5478	Hannan-Quinn criter.		1.220106
F-statistic	80.39092	Durbin-Watson stat		1.768805
Prob(F-statistic)	0.000000			

Equação 2: teste de Breusch-Pagan

Dependent Variable: RES2
Included observations: 526

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.120129	0.078134	1.537466	0.1248
EDUC	0.002752	0.005497	0.500736	0.6168
EXPER	0.000379	0.001292	0.292945	0.7697
TENURE	0.006216	0.002320	2.679455	0.0076

R-squared	0.020459	Mean dependent var		0.192881
Adjusted R-squared	0.014829	S.D. dependent var		0.333090
S.E. of regression	0.330611	Akaike info criterion		0.631827
Sum squared resid	57.05649	Schwarz criterion		0.664263
Log likelihood	-162.1704	Hannan-Quinn criter.		0.644527
F-statistic	3.634140	Durbin-Watson stat		2.023005
Prob(F-statistic)	0.012855			

Nota: RES= resíduos da equação 1; RES2= RES^2

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	3.634140	Prob. F(3,522)	0.0129
Obs*R-squared	10.76121	Prob. Chi-Square(3)	0.0131
Scaled explained SS	15.77309	Prob. Chi-Square(3)	0.0013

Equação 3: teste de White

Dependent Variable: RES2
Included observations: 526

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.605591	0.276645	2.189050	0.0290
EDUC	-0.067282	0.037395	-1.799252	0.0726
EXPER	-0.011996	0.009203	-1.303433	0.1930
TENURE	0.031285	0.013716	2.280877	0.0230
EDUC^2	0.002228	0.001297	1.717384	0.0865
EXPER^2	-1.19E-05	0.000108	-0.110391	0.9121
TENURE^2	0.000288	0.000246	1.174791	0.2406
EDUC*EXPER	0.001245	0.000554	2.247262	0.0250
EDUC*TENURE	-0.001511	0.000821	-1.839578	0.0664
EXPER*TENURE	-0.000484	0.000272	-1.778405	0.0759

R-squared	0.039432	Mean dependent var	0.192881
Adjusted R-squared	0.022678	S.D. dependent var	0.333090
S.E. of regression	0.329291	Akaike info criterion	0.635080
Sum squared resid	55.95130	Schwarz criterion	0.716170
Log likelihood	-157.0261	Hannan-Quinn criter.	0.666830
F-statistic	2.353602	Durbin-Watson stat	2.023045
Prob(F-statistic)	0.013105		

Heteroskedasticity Test: White

F-statistic	2.353602	Prob. F(9,516)	0.0131
Obs*R-squared	20.74147	Prob. Chi-Square(9)	0.0138
Scaled explained SS	30.40151	Prob. Chi-Square(9)	0.0004

Equação 4: Teste simplificado de White

Dependent Variable: RES2
Included observations: 526

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.324943	0.259390	1.252722	0.2109
YFIT	-0.277446	0.311582	-0.890443	0.3736
YFIT^2	0.116848	0.092826	1.258785	0.2087
R-squared	0.012729	Mean dependent var		0.192881
Adjusted R-squared	0.008953	S.D. dependent var		0.333090
S.E. of regression	0.331595	Akaike info criterion		0.635885
Sum squared resid	57.50674	Schwarz criterion		0.660212
Log likelihood	-164.2377	Hannan-Quinn criter.		0.645410
F-statistic	3.371465	Durbin-Watson stat		2.038899
Prob(F-statistic)	0.035087			

Nota: YFIT=valores ajustados de LWAGE da equação 1

2. Estimação robusta à heterocedasticidade

Dependent Variable: LWAGE
Included observations: 526
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.284360	0.111707	2.545587	0.0112
EDUC	0.092029	0.007921	11.61806	0.0000
EXPER	0.004121	0.001746	2.360489	0.0186
TENURE	0.022067	0.003782	5.834767	0.0000
R-squared	0.316013	Mean dependent var		1.623268
Adjusted R-squared	0.312082	S.D. dependent var		0.531538
S.E. of regression	0.440862	Akaike info criterion		1.207406
Sum squared resid	101.4556	Schwarz criterion		1.239842
Log likelihood	-313.5478	Hannan-Quinn criter.		1.220106
F-statistic	80.39092	Durbin-Watson stat		1.768805
Prob(F-statistic)	0.000000			