

السلسلة 5: اختلاف التباين:.....أ. لمزاودة

التمرين 1: البيانات التالية توضح إجمالي الانفاق الاستهلاكي (Ci) وإجمالي الدخل (Yd) لثلاثون أسرة.

	Ci	Yd
1	10600	12000
2	10800	12000
3	11100	12000
4	11400	13000
5	11700	13000
6	12100	13000
7	12300	14000
8	12600	14000
9	13200	14000
10	13000	15000
11	13300	15000
12	13600	15000
13	13800	16000
14	14000	16000
15	14200	16000
16	14400	17000
17	14900	17000
18	15300	17000
19	15000	18000
20	15700	18000
21	16400	18000
22	15900	19000
23	16500	19000
24	16900	19000
25	16900	20000
26	17500	20000
27	18100	20000
28	17200	21000
29	17800	21000
30	18500	21000

المطلوب:

- ✓ أوجد معادلة انحدار (Ci) على (Yd)؛
- ✓ أختبر وجود اختلاف التباين عند مستوى معنوية 5% باستعمال اختبار (Breusch-Pagan LM test)
- ✓ أختبر وجود اختلاف التباين عند مستوى معنوية 5% باستعمال اختبار جولد فيلد- كوانت مع استعمال 12 مشاهدة.
- ✓ حل مشكلة اختلاف التباين باستعمال طريقة المربعات الصغرى المعممة.
- ✓ تأكد خلو النموذج من اختلاف التباين.
- ✓

الملاحق المساعدة:

Dependent Variable: CI Method: Least Squares Date: 03/07/26 Time: 13:06 Sample: 1 12 Included observations: 12				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
YD	0.746667	0.149310	5.000797	0.0005
C	2306.667	2916.317	0.790952	0.4473
R-squared	0.714351	Mean dependent var	16866.67	
Adjusted R-squared	0.685786	S.D. dependent var	1031.621	
S.E. of regression	578.2733	Akaike info criterion	15.70898	
Sum squared resid	3344000.	Schwarz criterion	15.78980	
Log likelihood	-92.25389	Hannan-Quinn criter.	15.67906	
F-statistic	25.00797	Durbin-Watson stat	2.360407	
Prob(F-statistic)	0.000537			

Dependent Variable: CI Method: Least Squares Date: 03/07/26 Time: 13:04 Sample: 1 12 Included observations: 12				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
YD	0.836667	0.084420	9.910812	0.0000
C	846.6667	1143.566	0.740374	0.4761
R-squared	0.907599	Mean dependent var	12141.67	
Adjusted R-squared	0.898359	S.D. dependent var	1025.545	
S.E. of regression	326.9557	Akaike info criterion	14.56854	
Sum squared resid	1069000.	Schwarz criterion	14.64936	
Log likelihood	-85.41123	Hannan-Quinn criter.	14.53862	
F-statistic	98.22420	Durbin-Watson stat	2.598722	
Prob(F-statistic)	0.000002			

السلسلة 5: اختلاف التباين:.....أ. لمزاودة

Dependent Variable: E 2  
Method: Least Squares  
Date: 03/07/26 Time: 14:07  
Sample: 1 30  
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
YD	29.46019	12.19415	2.415928	0.0225
C	-319620.3	204229.3	-1.565008	0.1288

R-squared 0.172496 Mean dependent var 166472.7  
Adjusted R-squared 0.142943 S.D. dependent var 207221.2  
S.E. of regression 191840.0 Akaike info criterion 27.23105  
Sum squared resid 1.03E+12 Schwarz criterion 27.32446  
Log likelihood -406.4658 Hannan-Quinn criter. 27.26093  
F-statistic 5.836708 Durbin-Watson stat 2.140400  
Prob(F-statistic) 0.022467

Dependent Variable: CI  
Method: Least Squares  
Date: 03/07/26 Time: 14:09  
Sample: 1 30  
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
YD	0.788485	0.026845	29.37161	0.0000
C	1480.000	449.6059	3.291772	0.0027

R-squared 0.968564 Mean dependent var 14490.00  
Adjusted R-squared 0.967441 S.D. dependent var 2340.550  
S.E. of regression 422.3312 Akaike info criterion 14.99380  
Sum squared resid 4994182. Schwarz criterion 15.08721  
Log likelihood -222.9070 Hannan-Quinn criter. 15.02368  
F-statistic 862.6916 Durbin-Watson stat 2.631531  
Prob(F-statistic) 0.000000

Dependent Variable: E 2  
Method: Least Squares  
Date: 03/07/26 Time: 14:07  
Sample: 1 30  
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
YD	29.46019	12.19415	2.415928	0.0225
C	-319620.3	204229.3	-1.565008	0.1288

R-squared 0.172496 Mean dependent var 166472.7  
Adjusted R-squared 0.142943 S.D. dependent var 207221.2  
S.E. of regression 191840.0 Akaike info criterion 27.23105  
Sum squared resid 1.03E+12 Schwarz criterion 27.32446  
Log likelihood -406.4658 Hannan-Quinn criter. 27.26093  
F-statistic 5.836708 Durbin-Watson stat 2.140400  
Prob(F-statistic) 0.022467

Heteroskedasticity Test: Breusch-Pagan-Godfrey  
Null hypothesis: Homoskedasticity

F-statistic	5.836691	Prob. F(1,26)	0.0225
Obs*R-squared	5.174877	Prob. Chi-Square(1)	0.0229
Scaled explained SS	3.376007	Prob. Chi-Square(1)	0.0662

Test Equation:  
Dependent Variable: RESID^2  
Method: Least Squares  
Date: 03/07/26 Time: 14:10  
Sample: 1 30  
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-319620.2	204229.5	-1.565005	0.1288
YD	29.46018	12.19416	2.415924	0.0225

R-squared 0.172496 Mean dependent var 166472.7  
Adjusted R-squared 0.142942 S.D. dependent var 207221.4  
S.E. of regression 191840.2 Akaike info criterion 27.23105  
Sum squared resid 1.03E+12 Schwarz criterion 27.32447  
Log likelihood -406.4658 Hannan-Quinn criter. 27.26094  
F-statistic 5.836691 Durbin-Watson stat 2.140401  
Prob(F-statistic) 0.022467

Null hypothesis: Homoskedasticity

F-statistic	0.323006	Prob. F(1,28)	0.5743
Obs*R-squared	0.342131	Prob. Chi-Square(1)	0.5586
Scaled explained SS	0.279557	Prob. Chi-Square(1)	0.5970

Test Equation:  
Dependent Variable: RESID^2  
Method: Least Squares  
Date: 03/07/26 Time: 15:29  
Sample: 1 30  
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.159829	0.305457	3.797033	0.0007
YDS	-0.001095	0.001926	-0.568336	0.5743

R-squared 0.011404 Mean dependent var 1.091725  
Adjusted R-squared -0.023903 S.D. dependent var 1.520871  
S.E. of regression 1.538940 Akaike info criterion 3.764405  
Sum squared resid 66.31340 Schwarz criterion 3.857818  
Log likelihood -54.46608 Hannan-Quinn criter. 3.794289  
F-statistic 0.323006 Durbin-Watson stat 1.661269  
Prob(F-statistic) 0.574337

Dependent Variable: CIS  
Method: Least Squares  
Date: 03/07/26 Time: 15:27  
Sample: 1 30  
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
YDS	0.880855	0.001353	650.8287	0.0000
C	-0.087054	0.214668	-0.405527	0.6882

R-squared 0.999934 Mean dependent var 54.72166  
Adjusted R-squared 0.999932 S.D. dependent var 130.7135  
S.E. of regression 1.081529 Akaike info criterion 3.058970  
Sum squared resid 32.75176 Schwarz criterion 3.152383  
Log likelihood -43.88455 Hannan-Quinn criter. 3.088853  
F-statistic 423578.1 Durbin-Watson stat 1.890537  
Prob(F-statistic) 0.000000