**I EXAMEN**

**ESTADÍSTICA PARA ECONOMISTAS I**

1. Considérese los datos contenidos en el archivo: Data1\_Examen. Supóngase además que se desea ajustar el modelo:



1. Estímese la regresión anterior

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: LY | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 09:04 | | | | |
| Sample: 1960 1982 | | | | |
| Included observations: 23 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 2.432539 | 0.161811 | 15.03316 | 0.0000 |
| LX2 | 0.346465 | 0.071798 | 4.825530 | 0.0002 |
| LX3 | -0.588074 | 0.100524 | -5.850108 | 0.0000 |
| LX4 | 0.365333 | 0.117870 | 3.099451 | 0.0065 |
| LX5 | 0.340339 | 0.127057 | 2.678642 | 0.0159 |
| LX6 | -0.453193 | 0.168669 | -2.686874 | 0.0156 |
| R-squared | 0.987585 | Mean dependent var | | 3.663887 |
| Adjusted R-squared | 0.983934 | S.D. dependent var | | 0.187659 |
| S.E. of regression | 0.023786 | Akaike info criterion | | -4.419967 |
| Sum squared resid | 0.009618 | Schwarz criterion | | -4.123751 |
| Log likelihood | 56.82962 | F-statistic | | 270.4698 |
| Durbin-Watson stat | 2.173348 | Prob(F-statistic) | | 0.000000 |

1. Pruebe las siguientes hipótesis:

* 





Siendo:



Y además,

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | C | LX2 | LX3 | LX4 | LX5 | LX6 |
|  |  |  |  |  |  |  |
| C | 0.026183 | -0.004743 | -0.014078 | 0.014767 | 0.013701 | -0.015238 |
| LX2 | -0.004743 | 0.005155 | 0.004244 | -0.004769 | -0.005109 | -0.000245 |
| LX3 | -0.014078 | 0.004244 | 0.010105 | -0.008625 | -0.008324 | 0.005241 |
| LX4 | 0.014767 | -0.004769 | -0.008625 | 0.013893 | 0.010951 | -0.013609 |
| LX5 | 0.013701 | -0.005109 | -0.008324 | 0.010951 | 0.016143 | -0.015646 |
| LX6 | -0.015238 | -0.000245 | 0.005241 | -0.013609 | -0.015646 | 0.028449 |







Entonces:







* 







Siendo:



Y además,

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | C | LX2 | LX3 | LX4 | LX5 | LX6 |
|  |  |  |  |  |  |  |
| C | 0.026183 | -0.004743 | -0.014078 | 0.014767 | 0.013701 | -0.015238 |
| LX2 | -0.004743 | 0.005155 | 0.004244 | -0.004769 | -0.005109 | -0.000245 |
| LX3 | -0.014078 | 0.004244 | 0.010105 | -0.008625 | -0.008324 | 0.005241 |
| LX4 | 0.014767 | -0.004769 | -0.008625 | 0.013893 | 0.010951 | -0.013609 |
| LX5 | 0.013701 | -0.005109 | -0.008324 | 0.010951 | 0.016143 | -0.015646 |
| LX6 | -0.015238 | -0.000245 | 0.005241 | -0.013609 | -0.015646 | 0.028449 |







Entonces:







* 



Siendo:



Y además,

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | C | LX2 | LX3 | LX4 | LX5 | LX6 |
|  |  |  |  |  |  |  |
| C | 0.026183 | -0.004743 | -0.014078 | 0.014767 | 0.013701 | -0.015238 |
| LX2 | -0.004743 | 0.005155 | 0.004244 | -0.004769 | -0.005109 | -0.000245 |
| LX3 | -0.014078 | 0.004244 | 0.010105 | -0.008625 | -0.008324 | 0.005241 |
| LX4 | 0.014767 | -0.004769 | -0.008625 | 0.013893 | 0.010951 | -0.013609 |
| LX5 | 0.013701 | -0.005109 | -0.008324 | 0.010951 | 0.016143 | -0.015646 |
| LX6 | -0.015238 | -0.000245 | 0.005241 | -0.013609 | -0.015646 | 0.028449 |







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Entonces:







1. Con base a sus resultados anteriores vuelva a estimar el modelo propuesto utilizando en método de mínimos cuadrados restringidos.

Siendo:







Y además,









|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: Y1 | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 10:16 | | | | |
| Sample: 1960 1982 | | | | |
| Included observations: 23 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| X44 | 0.401125 | 0.014480 | 27.70122 | 0.0000 |
| X25 | 0.316074 | 0.016428 | 19.24003 | 0.0000 |
| X63 | -0.414747 | 0.062423 | -6.644136 | 0.0000 |
| R-squared | 0.996961 | Mean dependent var | | 7.510757 |
| Adjusted R-squared | 0.996658 | S.D. dependent var | | 0.389079 |
| S.E. of regression | 0.022494 | Akaike info criterion | | -4.630008 |
| Sum squared resid | 0.010120 | Schwarz criterion | | -4.481900 |
| Log likelihood | 56.24509 | F-statistic | | 3280.980 |
| Durbin-Watson stat | 1.928898 | Prob(F-statistic) | | 0.000000 |



1. Considérese los datos contenidos en el archivo: Data2\_Examen.
2. Realice la regresión de las horas promedio trabajadas durante un año sobre las variables suministradas e interprete sus resultados.
3. ¿Existe evidencia de multicolinealidad en los datos? ¿Cómo sabe?
4. Si existe un problema de multicolinealidad adopte alguna acción correctiva y muestre sus resultados definitivos.
5. Considérese los datos contenidos en el archivo: Data3\_Examen. Supóngase además que se desea ajustar el modelo:



1. Estímese la regresión anterior

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: Y | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 10:31 | | | | |
| Sample: 1 50 | | | | |
| Included observations: 50 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -1998.823 | 508.8787 | -3.927898 | 0.0003 |
| X2 | 6.793163 | 2.269121 | 2.993742 | 0.0044 |
| X3 | 0.977969 | 0.038266 | 25.55738 | 0.0000 |
| R-squared | 0.933771 | Mean dependent var | | 3316.151 |
| Adjusted R-squared | 0.930952 | S.D. dependent var | | 4360.365 |
| S.E. of regression | 1145.768 | Akaike info criterion | | 16.98366 |
| Sum squared resid | 61700916 | Schwarz criterion | | 17.09838 |
| Log likelihood | -421.5916 | F-statistic | | 331.3282 |
| Durbin-Watson stat | 1.600501 | Prob(F-statistic) | | 0.000000 |

1. Según la prueba de correlación de orden Spearman ¿Existe heterocedasticidad?

Coeficiente de correlación de X2 y VAE:















Coeficiente de correlación de X3 y VAE:















1. Según la prueba de Breusch-Pagan-Godfrey ¿Existe heterocedasticidad? ¿Por qué?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ANÁLISIS DE VARIANZA | |  |  |  |  |
|  | *Grados de libertad* | *Suma de cuadrados* | *Promedio de los cuadrados* | *F* | *Valor crítico de F* |
| Regresión | 2 | 198.7821509 | 99.3910754 | 15.0974773 | 8.629E-06 |
| Residuos | 47 | 309.4146437 | 6.58329029 |  |  |
| Total | 49 | 508.1967946 |  |  |  |
|  |  |  |  |  |  |
|  | *Coeficientes* | *Error típico* | *Estadístico t* | *Probabilidad* | *Inferior 95%* |
| Intercepción | -2.712865337 | 1.139564447 | -2.38061598 | 0.02138958 | -5.0053733 |
| Variable X 1 | 0.009575037 | 0.005081388 | 1.88433507 | 0.06571276 | -0.0006474 |
| Variable X 2 | 0.000467835 | 8.56907E-05 | 5.45958308 | 1.7517E-06 | 0.00029545 |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  | Chi-Cuadrado | 99.39107543 |  |  |  |
|  | P-valor | 2.61518E-22 |  |  |  |

1. Si existe heterocedasticidad utilice el método de mínimos cuadrados ponderados para estimar el modelo propuesto.

Prueba de Park:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: LE2 | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 11:20 | | | | |
| Sample: 1 50 | | | | |
| Included observations: 50 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 15.02890 | 4.357935 | 3.448629 | 0.0012 |
| LX2 | -0.500773 | 0.842035 | -0.594717 | 0.5548 |
| R-squared | 0.007315 | Mean dependent var | | 12.44174 |
| Adjusted R-squared | -0.013366 | S.D. dependent var | | 1.818448 |
| S.E. of regression | 1.830561 | Akaike info criterion | | 4.086299 |
| Sum squared resid | 160.8457 | Schwarz criterion | | 4.162780 |
| Log likelihood | -100.1575 | F-statistic | | 0.353688 |
| Durbin-Watson stat | 2.434530 | Prob(F-statistic) | | 0.554826 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: LE2 | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 11:20 | | | | |
| Sample: 1 50 | | | | |
| Included observations: 50 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 10.14988 | 1.940200 | 5.231358 | 0.0000 |
| LX3 | 0.292661 | 0.245588 | 1.191676 | 0.2392 |
| R-squared | 0.028735 | Mean dependent var | | 12.44174 |
| Adjusted R-squared | 0.008500 | S.D. dependent var | | 1.818448 |
| S.E. of regression | 1.810703 | Akaike info criterion | | 4.064485 |
| Sum squared resid | 157.3749 | Schwarz criterion | | 4.140966 |
| Log likelihood | -99.61212 | F-statistic | | 1.420091 |
| Durbin-Watson stat | 2.391215 | Prob(F-statistic) | | 0.239247 |

Prueba de Gleser:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: VAE | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 11:21 | | | | |
| Sample: 1 50 | | | | |
| Included observations: 50 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 641.9413 | 325.2543 | 1.973660 | 0.0542 |
| X2 | 0.506816 | 1.633893 | 0.310189 | 0.7578 |
| R-squared | 0.002001 | Mean dependent var | | 735.7124 |
| Adjusted R-squared | -0.018791 | S.D. dependent var | | 840.7635 |
| S.E. of regression | 848.6262 | Akaike info criterion | | 16.36429 |
| Sum squared resid | 34567989 | Schwarz criterion | | 16.44077 |
| Log likelihood | -407.1073 | F-statistic | | 0.096217 |
| Durbin-Watson stat | 2.227012 | Prob(F-statistic) | | 0.757760 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: VAE | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 11:21 | | | | |
| Sample: 1 50 | | | | |
| Included observations: 50 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 247.3716 | 130.7212 | 1.892361 | 0.0645 |
| X3 | 0.117686 | 0.021729 | 5.415975 | 0.0000 |
| R-squared | 0.379306 | Mean dependent var | | 735.7124 |
| Adjusted R-squared | 0.366375 | S.D. dependent var | | 840.7635 |
| S.E. of regression | 669.2526 | Akaike info criterion | | 15.88938 |
| Sum squared resid | 21499155 | Schwarz criterion | | 15.96586 |
| Log likelihood | -395.2345 | F-statistic | | 29.33278 |
| Durbin-Watson stat | 2.372452 | Prob(F-statistic) | | 0.000002 |

Prueba de K-B:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: E2 | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 11:23 | | | | |
| Sample: 1 50 | | | | |
| Included observations: 50 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 220494.3 | 473413.5 | 0.465754 | 0.6435 |
| YF2 | 0.035693 | 0.006268 | 5.694508 | 0.0000 |
| R-squared | 0.403189 | Mean dependent var | | 1234018. |
| Adjusted R-squared | 0.390755 | S.D. dependent var | | 3974107. |
| S.E. of regression | 3101955. | Akaike info criterion | | 32.77214 |
| Sum squared resid | 4.62E+14 | Schwarz criterion | | 32.84862 |
| Log likelihood | -817.3035 | F-statistic | | 32.42742 |
| Durbin-Watson stat | 2.177752 | Prob(F-statistic) | | 0.000001 |

Minimos cuadrados ponderados:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: YT | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 11:27 | | | | |
| Sample: 1 50 | | | | |
| Included observations: 50 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| X1T | -427.4245 | 171.8592 | -2.487062 | 0.0165 |
| X2T | 1.543744 | 0.562379 | 2.745026 | 0.0085 |
| X3T | 0.833338 | 0.034539 | 24.12777 | 0.0000 |
| R-squared | 0.837196 | Mean dependent var | | 44.61029 |
| Adjusted R-squared | 0.830269 | S.D. dependent var | | 28.81817 |
| S.E. of regression | 11.87265 | Akaike info criterion | | 7.844476 |
| Sum squared resid | 6625.107 | Schwarz criterion | | 7.959197 |
| Log likelihood | -193.1119 | F-statistic | | 120.8457 |
| Durbin-Watson stat | 1.407746 | Prob(F-statistic) | | 0.000000 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: Y | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 11:28 | | | | |
| Sample: 1 50 | | | | |
| Included observations: 50 | | | | |
| Weighting series: 1/(X3)^0.5 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -427.4245 | 171.8592 | -2.487062 | 0.0165 |
| X2 | 1.543744 | 0.562379 | 2.745026 | 0.0085 |
| X3 | 0.833338 | 0.034539 | 24.12777 | 0.0000 |
| Weighted Statistics |  |  |  |  |
| R-squared | 0.837196 | Mean dependent var | | 1954.912 |
| Adjusted R-squared | 0.830269 | S.D. dependent var | | 1262.870 |
| S.E. of regression | 520.2831 | Akaike info criterion | | 15.40475 |
| Sum squared resid | 12722639 | Schwarz criterion | | 15.51947 |
| Log likelihood | -382.1187 | F-statistic | | 120.8457 |
| Durbin-Watson stat | 1.407746 | Prob(F-statistic) | | 0.000000 |
| Unweighted Statistics |  |  |  |  |
| R-squared | 0.910599 | Mean dependent var | | 3316.151 |
| Adjusted R-squared | 0.906795 | S.D. dependent var | | 4360.365 |
| S.E. of regression | 1331.197 | Sum squared resid | | 83287963 |
| Durbin-Watson stat | 1.770542 |  |  |  |

1. Obtenga los errores estándar de Newey-West consistentes con la heterocedasticidad y compárelos con los errores estándar de MCO. ¿Qué conclusiones obtiene?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: Y | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 11:31 | | | | |
| Sample: 1 50 | | | | |
| Included observations: 50 | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -1998.823 | 508.8787 | -3.927898 | 0.0003 |
| X2 | 6.793163 | 2.269121 | 2.993742 | 0.0044 |
| X3 | 0.977969 | 0.038266 | 25.55738 | 0.0000 |
| R-squared | 0.933771 | Mean dependent var | | 3316.151 |
| Adjusted R-squared | 0.930952 | S.D. dependent var | | 4360.365 |
| S.E. of regression | 1145.768 | Akaike info criterion | | 16.98366 |
| Sum squared resid | 61700916 | Schwarz criterion | | 17.09838 |
| Log likelihood | -421.5916 | F-statistic | | 331.3282 |
| Durbin-Watson stat | 1.600501 | Prob(F-statistic) | | 0.000000 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Dependent Variable: Y | | | | |
| Method: Least Squares | | | | |
| Date: 01/02/18 Time: 11:30 | | | | |
| Sample: 1 50 | | | | |
| Included observations: 50 | | | | |
| Newey-West HAC Standard Errors & Covariance (lag truncation=3) | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -1998.823 | 821.7981 | -2.432256 | 0.0189 |
| X2 | 6.793163 | 3.348777 | 2.028550 | 0.0482 |
| X3 | 0.977969 | 0.086978 | 11.24392 | 0.0000 |
| R-squared | 0.933771 | Mean dependent var | | 3316.151 |
| Adjusted R-squared | 0.930952 | S.D. dependent var | | 4360.365 |
| S.E. of regression | 1145.768 | Akaike info criterion | | 16.98366 |
| Sum squared resid | 61700916 | Schwarz criterion | | 17.09838 |
| Log likelihood | -421.5916 | F-statistic | | 331.3282 |
| Durbin-Watson stat | 1.600501 | Prob(F-statistic) | | 0.000000 |