# 油耗与重量关系研究

## 描述变量

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 变量名 | 类型 | 格式 | 值标签 | 标签 |
| 油耗 | float | %9.0g |  | 油量消耗(公升每一百公里) |
| 重量 | float | %8.0gc |  | 重量(公斤) |

## 摘要统计

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 变量 | 观测 | 均值 | 标准差 | 最小值 | 最大值 |
| 油耗 | 74 | 5.019 | 1.28 | 2.439 | 8.333 |
| 重量 | 74 | 1370 | 352.5 | 798.3 | 2195 |

变量**重量**的最小值798.32,最大值2195.39,极差1397.06.

## 图: 油耗与重量


**图1: 油耗与重量**

## 研究油耗与重量关系 - 线性回归

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 油耗 | Coef. | Std. Err. | t | P>|t| | [95% Conf. Interval] |
| 重量 | .003102 | .0002223 | 13.95 | 0.000 | .0026589 | .0035452 |
| \_cons | .7707669 | .3142571 | 2.45 | 0.017 | .1443069 | 1.397227 |

线性回归结果显示重量每增加一百公斤,每百公里油耗增加*.31*公升。

## 用-estimates table-对比线性回归结果

|  |  |  |
| --- | --- | --- |
|  | 模型1    | 模型2    |
| 重量(公斤) | 0.0030\*\*\* | 0.0028\*\*\* |
| 变速比 | 0.1706    | -0.3367    |
| 转弯半径(米)  | 0.0798    | 0.2010    |
| 国籍 |     | 0.8650\*\*\* |
| Constant | -0.5814    | -0.4661    |
| N | 74    | 74    |
| r2 | 0.7332    | 0.7767    |
| r2\_a | 0.7218    | 0.7637    |

## Produce a table from community-contributed -esttab-

用-esttab-对比线性回归结果

|  |
| --- |
| 线性回归表使用esttab |
|  | 油耗 | 油耗 |
|  | b/t | b/t |
| 重量(公斤) | 0.003\*\*\* | 0.003\*\*\* |
|  | (6.09) | (6.06) |
| 变速比 | 0.171 | -0.337 |
|  | (0.64) | (-1.19) |
| 转弯半径(米)  | 0.080 | 0.201 |
|  | (0.70) | (1.81) |
| 国籍 |  | 0.865\*\*\* |
|  |  | (3.66) |
| Constant | -0.581 | -0.466 |
|  | (-0.38) | (-0.33) |
| Observations | 74 | 74 |
| R-squared | 0.73 | 0.78 |
| Adjusted R-squared | 0.72 | 0.76 |
| *t statistics in parentheses* |
| *\* p<0.05, \*\* p<0.01, \*\*\* p<0.001* |

## 不同国籍车辆对比

|  |  |
| --- | --- |
| 国外 | 国内 |
|

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 观测 | 均值 | 标准差 | 最小值 | 最大值 |
| 油耗 | 22 | 4.313 | 1.144 | 2.439 | 7.143 |
| 重量 | 22 | 1050 | 196.4 | 798.3 | 1551 |

 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 观测 | 均值 | 标准差 | 最小值 | 最大值 |
|  | 52 | 5.318 | 1.224 | 2.941 | 8.333 |
|  | 52 | 1505 | 315.4 | 816.5 | 2195 |

 |
|  |  |
|

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | b | t | b | t |
| 重量(公斤) | 0.003\*\* | (3.49) | 0.003\*\*\* | (5.07) |
| 变速比 | -0.577 | (-1.12) | -0.234 | (-0.72) |
| 转弯半径(米)  | 0.672 | (1.67) | 0.217 | (1.92) |
| Constant | -4.478 | (-1.00) | -0.640 | (-0.43) |
| Observations | 22 |  | 52 |  |
| R-squared | 0.73 |  | 0.78 |  |
| Adjusted R-squared | 0.69 |  | 0.77 |  |

 |

## Stata命令输出

. use auto\_zh, clear
(1978年汽车数据)

. regress 油耗 重量

 Source | SS df MS Number of obs = 74
-------------+---------------------------------- F(1, 72) = 194.71
 Model | 87.2964971 1 87.2964971 Prob > F = 0.0000
 Residual | 32.2797637 72 .448330051 R-squared = 0.7300
-------------+---------------------------------- Adj R-squared = 0.7263
 Total | 119.576261 73 1.63803097 Root MSE = .66957

------------------------------------------------------------------------------
 油耗 | Coef. Std. Err. t P>|t| [95% Conf. Interval]
-------------+----------------------------------------------------------------
 重量 | .003102 .0002223 13.95 0.000 .0026589 .0035452
 \_cons | .7707669 .3142571 2.45 0.017 .1443069 1.397227
------------------------------------------------------------------------------

. mata:
------------------------------------------------- mata (type end to exit) ------
: st\_view(Y=.,.,("油耗"), .)

: st\_view(X=.,.,("重量"), .)

: X=X,J(rows(X),1,1)

: b=invsym(X'\*X)\*X'\*Y

: v=((Y- X\*b)'\*(Y- X\*b))/(rows(X)-cols(X))\*invsym(X'\*X)

: se=sqrt(diagonal(v))

: t=b:/se

: p=2\*ttail(rows(X)-cols(X),abs(t))

: b,se,t,p
 1 2 3 4
 +---------------------------------------------------------+
 1 | .0031020043 .0002223018 13.95402458 3.66622e-22 |
 2 | .7707668702 .3142570686 2.45266359 .0166043065 |
 +---------------------------------------------------------+

: end
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