

## 1. Problem

Using the data provided in `regression.csv` estimate a linear regression of  $y$  on  $x_1$  and  $x_2$ . Answer the following questions.

- (a) Proportion of variance explained (in percent):
- (b) F-statistic:
- (c) Characterize in your own words how the response  $y$  depends on the regressors  $x_1$  and  $x_2$ .
- (d) Upload the R script you used to analyze the data.

## Solution

The presented results describe a semi-logarithmic regression.

Call:

```
lm(formula = log(y) ~ x1 + x2, data = d)
```

Residuals:

Min	1Q	Median	3Q	Max
-2.68802	-0.67816	-0.01803	0.68866	2.35064

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	-0.06802	0.13491	-0.504	0.616
x1	1.37863	0.13351	10.326	9.34e-15 ***
x2	-0.21449	0.13995	-1.533	0.131

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Residual standard error: 1.052 on 58 degrees of freedom

Multiple R-squared: 0.6511, Adjusted R-squared: 0.6391

F-statistic: 54.12 on 2 and 58 DF, p-value: 5.472e-14

The mean of the response  $y$  increases with increasing  $x_1$ . If  $x_1$  increases by 1 unit then a change of  $y$  by about 296.94 percent can be expected. Also, the effect of  $x_1$  is significant at the 5 percent level.

Variable  $x_2$  has no significant influence on the response at 5 percent level.

The R-squared is 0.6511 and thus 65.11 percent of the variance of the response is explained by the regression.

The F-statistic is 54.12.

- (a) Proportion of variance explained: 65.11 percent.
- (b) F-statistic: 54.12.
- (c) Characterization: semi-logarithmic.
- (d) R code.