

Bjørnar's assignment in Gretl

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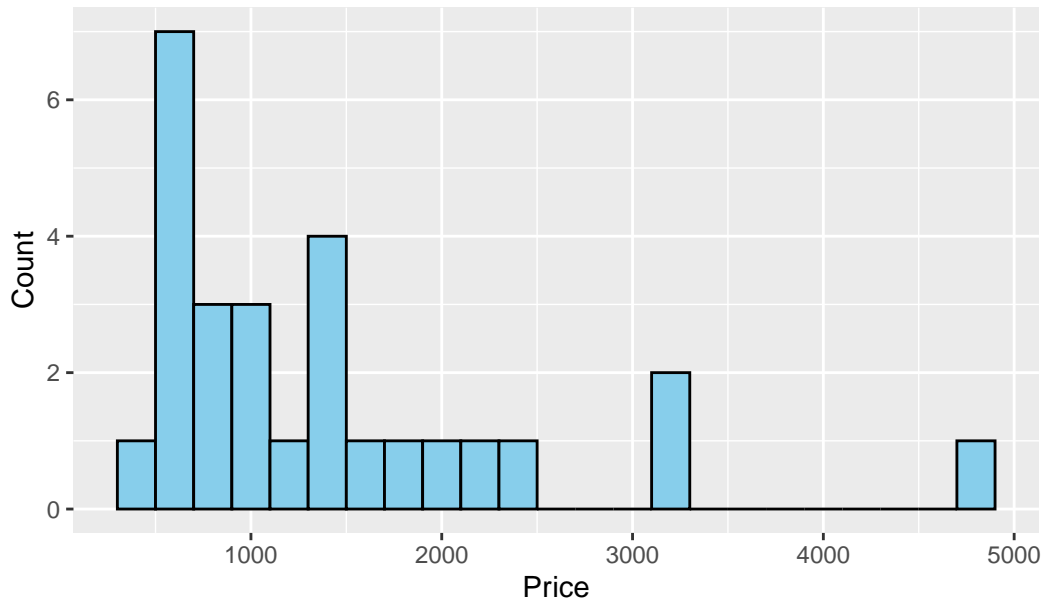
[Bjørnar's assignment](#)

Inline equations $\theta = 2 + 2$

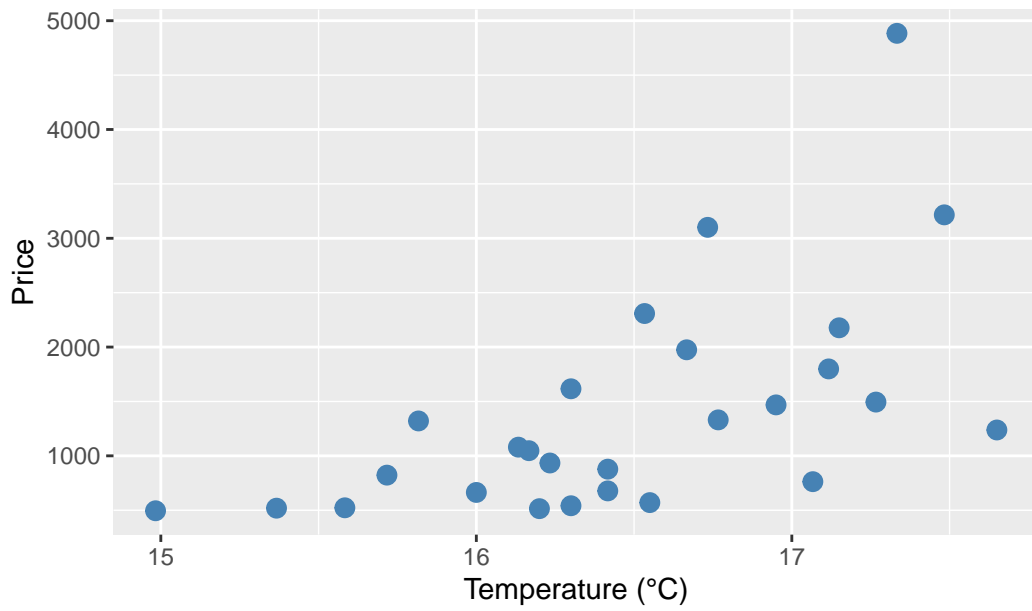
Exercise 1

obs	price	WinterRain	temp	HarvestRain	Age
Min. :1952	Min. : 495.2	Min. :376.0	Min. :14.98	Min. : 38.0	Min. : 3.0
1st Qu.:1959	1st Qu.: 670.8	1st Qu.:543.5	1st Qu.:16.15	1st Qu.: 88.0	1st Qu.: 9.0
Median :1966	Median :1079.8	Median :600.0	Median :16.42	Median :123.0	Median :16.0
Mean :1966	Mean :1405.8	Mean :608.4	Mean :16.48	Mean :144.8	Mean :16.0
3rd Qu.:1973	3rd Qu.:1707.7	3rd Qu.:705.5	3rd Qu.:17.01	3rd Qu.:185.5	3rd Qu.:22.0
Max. :1980	Max. :4883.9	Max. :830.0	Max. :17.65	Max. :292.0	Max. :31.0
	NA's :2	NA's :2	NA's :2	NA's :2	NA's :2

Histogram of Wine Prices



Scatterplot: Wine Price vs Temperature



Exercise 2

Model 1

$$price_i = \beta_0 + \beta_1 Age_i + u_i$$

a.

Model 3: OLS, using observations 1-29

Dependent variable: price

	Coefficient	Std. Error	t-ratio	p-value
const	494.278	402.112	1.229	0.2304
Age	56.318	22.222	2.534	0.0179 **

R-squared: 0.2043

Adjusted R-squared: 0.1728

F-statistic: 6.420

P-value (F): 0.0179

b.

For each year the wine gets older, its price is expected to increase by 56.318 units.

c.

P-value (0.0179) > (0.01)

Significance level () = 0.01 (1%)

$H_0 : \beta = 0$

$H_1 : \beta \neq 0$

P-value is higher than 0.01, that means age is not statistically significant.

d.

	Age	Predicted_Price
1	3.00000	663.23
2	16.18519	1405.80
3	31.00000	2240.15

Exercise 3

Model 2

$$price_i = \beta_0 + \beta_1 Age_i + \beta_2 WinterRain_i + \beta_3 temp_i + \beta_3 HarvestRain_i + u_i$$

a.

Model 4: OLS, using observations 1952-1980 (T = 27)

Missing or incomplete observations dropped: 2

Dependent variable: price

	coefficient	std. error	t-ratio	p-value	
const	-15509,0	3379,87	-4,589	0,0001	***
Age	39,2126	14,3490	2,733	0,0121	**
WinterRain	2,75098	0,965119	2,850	0,0093	***
temp	930,787	190,557	4,885	6,97e-05	***
HarvestRain	-5,04694	1,61682	-3,122	0,0050	***
Mean dependent var	1405,800	S.D. dependent var	1027,226		
Sum squared resid	7238994	S.E. of regression	573,6246		
R-squared	0,736141	Adjusted R-squared	0,688166		
F(4, 22)	15,34443	P-value(F)	3,93e-06		
Log-likelihood	-207,0499	Akaike criterion	424,0999		
Schwarz criterion	430,5791	Hannan-Quinn	426,0265		

b.

Age:

Coefficient = 39.21

P-value = 0.0121

Wine price increases by 39.21 each year.

WinterRain:

Coefficient = 2.75

P-value = 0.0093

Wine price increases by 2.75 each mm winter rainfall.

Temperature:

Coefficient = 930.79

P-value = 0.00007

Wine price increases by 930.79 every 1 degree.

HarvestRain

Coefficient = -5.05

P-value = 0.0050

Wine price decreases by 5.05 each additional 1 mm HarvestRain

c.

Adding more variables improves the model to explain the wine prices.

Exercise 4

Model 3

$$price_i = \beta_0 + \beta_1 Dheavyrain_i + \beta_2 tempt_i + \beta_3 temp_i \cdot Dheavyrain_i + u_i$$

a.

Model 2: OLS, using observations 1952-1980 (T = 27)

Missing or incomplete observations dropped: 2

Dependent variable: price

	coefficient	std. error	t-ratio	p-value	
const	-16289,5	4395,18	-3,706	0,0012	***
Dheavyrain	11634,1	8990,38	1,294	0,2085	
temp	1082,95	266,391	4,065	0,0005	***
temp_Dheavyrain	-756,902	546,064	-1,386	0,1790	
Mean dependent var	1405,800	S.D. dependent var	1027,226		
Sum squared resid	14038659	S.E. of regression	781,2660		
R-squared	0,488295	Adjusted R-squared	0,421550		
F(3, 23)	7,315911	P-value(F)	0,001294		
Log-likelihood	-215,9914	Akaike criterion	439,9829		

Schwarz criterion 445,1662 Hannan-Quinn 441,5242

Excluding the constant, p-value was highest for variable 6 (Dheavyrain)

b.

Temp * Dheavyrain captures whether the impact of temperature on price depends on harvest rainfall. Dheavyrain captures the shift in wine price when harvest rainfall is very high, regardless of temperature.

Exercise 5

a.

Model	Actual Price	Predicted Price	Residual	
-----	-----	-----	-----	
Model 1	4883.90	1733.28	3150.62	
Model 2	4883.90	3578.80	1305.10	
Model 3	4883.90	2481.70	2402.20	

b.

Model 2 is the best model for predicting Bordeaux wine price.

It has multiple significant variables and is a better fit.