

Task T4

The Multiple Regression Model. Specification

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Dpt. Applied Economics III (Econometrics and Statistics)

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T4.1. Function plots.

Plot these functions using Gretl:

$$Y = 2 + 5X$$

$$Y = 2 - 5X$$

$$Y = 2 + 5X - 3X^2$$

$$Y = 2 + 5X + 3X^2$$

$$Y = 2 + 5 \ln X$$

$$Y = 2 - 5 \ln X$$

$$Y = 2e^X$$

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T4.2.1. Entering new dummy variables.

Beach umbrella rental.

Open the data file `umbrellas.gdt` and consider the variable W (windy week):

t	1	2	3	4	5	6	7	8	9	10	11
W	yes	yes	no	yes	yes	no	no	no	no	yes	yes

t	12	13	14	15	16	17	18	19	20	21	22
W	yes	no	no	no	no	no	yes	no	no	no	yes

Add to this file a dummy variable defined as follows:

$$DW_t = \begin{cases} 1 & \text{if } t \text{ is a windy week} \\ 0 & \text{if } t \text{ is a non windy week} \end{cases}$$

T4.2.2. Dummy variables for discrete variables.

Beach umbrella rental.

Open the data file `umbrellas.gdt` and consider the discrete variable W , generated in Task T3.2. giving the value 1 to windy weeks and the value 2 to non windy weeks.

Generate a dummy variable for this discrete variable giving the value 1 to the windy weeks and the value 0 to the non windy weeks. Denote this dummy variable by WW .

Delete the variable DW generated in the previous section.

T4.2.2. Dummy variables for discrete variables.

Holiday cottages in Biscay.

The data file `cottages.gdt` contains information about some characteristics of the holiday cottages in Biscay:

- Add dummy variables for each discrete variable in the data file.
- Add a description for each dummy variable using the names given to these characteristics in Task T3.1. and indicating the units of measurement.
- Specify a regression model to determine the price of a room in Biscay and interpret its coefficients.

T4.2.3. Observation range dummies.

Registered vehicles.

The volume of registered vehicles in the period analysed may have been influenced by two facts:

1. The Spanish economic crisis.

Given that the Spanish GDP contracted for the first time in 15 years during the third quarter of 2008, the month of October of 2008 can be considered the beginning of the crisis.

2. Plan PIVE launched by the Spanish government to stimulate vehicle sales.

This plan offers discounts of €2000 on the purchase of a new vehicle: the Ministry of Industry contributes €1000 and the manufactures put in the other €1000.

Anyone applying for this plan must turn in a car over 10 years of age or a commercial vehicle over 7 years of age in exchange for the grant. The first plan PIVE started in November of 2008 and ended in June of 2010.

Add to the file `vehicles.gdt` the dummy variables needed to quantify these two effects: economic crisis and plan PIVE.

T4.2.4. Trend and seasonality.

Beach umbrella rental.

Given that the time series of the number of rented umbrellas shows an increasing behaviour, add a *trend* variable to the data file `umbrellas.gdt`.

Specify an econometric model to determine the number of rented umbrellas and interpret the coefficient of the trend variable.

Registered vehicles.

Given that the time series of registered vehicles shows a decreasing behaviour and a monthly seasonal pattern, add a *trend* variable and *seasonal dummy variables* to the data file `vehicles.gdt`.

Specify an econometric model to determine the number of vehicles registered in the Basque Country as a function of Brent oil price, the Basque IPI, the economic crisis, the plan PIVE, a trend and a seasonal effect.

According to your model, what is the expected number of registered vehicles for November 2007? And for July 2009? And for December 2012?