



## GREEK AND IBERIAN ELECTRICITY MARKETS

Electricity spot prices have unique features (such as non-storability, uncertain demand, seasonality) and hence are volatile. Consequently, electricity market participants are facing the electricity price risk and necessity of risk management practices. In particular, they have to use derivative contracts to fix their electricity purchasing costs.

### Task 1

The first task is to explore and compare the electricity price markets in Greece, and Portugal and Spain.

What can be done on the basic level:

- plotting the prices data, descriptive statistics
- initial analysis of seasonality and trend

### Task 2

The second task consists of the modelling of electricity prices, which includes the choice of model and performance analysis.

What can be done on the basic level:

- Choose the model, also based on the results of data exploration. Model could be selected according to BIC (Bayesian Information Criterion) values.

What can be done on the more advanced level:

- Performance analysis of simulations using MAPE (Mean Absolute Percentage Error), RMSE (Root Mean Square Error), R2 (Coefficient of determination)

### Task 3

There are several ways to define risk. One of them is Value at Risk. Value at Risk is the measure of the risk of loss. It estimates how much a set of investments might lose. In other words,  $p$  VaR is defined such that the probability of a loss greater than VaR is (at most)  $p$  while the probability of a loss less than VaR is (at least)  $1-p$ . In other words, when we want to know the  $p\%$  value, it means to find the  $p\%$  of distribution from the right, or, equivalently,  $(1-p)\%$  of distribution from the left (which is more convenient to use).

Suppose at 31.12.2021 you bought a forward contract to buy 1 MWh of electricity for a forward price of 150 EUR/MWh at a date of 01.02.2022 (one month maturity). The third task consists of calculating 10%, 5%, 1% VaR value for such portfolio by simulating the price paths with Monte Carlo approach and computing the distribution of profit and loss function.

