

Seminar exercise 5

1. The competition authority wants to know how use of market power can be discovered using data observable in the market.

Consider the optimisation problem for a hydro power producer being a monopolist within a country:

$$\max \sum_{t=1}^T p_t(e_t^H) \cdot e_t^H$$

subject to

$$R_t = R_{t-1} + w_t - e_t^H$$

$$R_t \leq \bar{R}$$

$$R_t, e_t^H \geq 0, \quad t = 1, \dots, T$$

$$T, w_t, R_0, \bar{R} \text{ given, } R_T \text{ free}$$

Use this model and three more models that are extensions of this model, to give advice to the competition authority.

The first additional model is a model where the monopolist also has thermal capacity. The costs $c(e_t^{Th})$ then enter the objective function and the thermal capacity is restricted: $e_t^{Th} \leq \bar{e}^{Th}$.

The second additional model is a model extended to international trade with electricity assuming that the monopolist control the import, but cannot influence the foreign price. Export income/import expenses $p_t^{XI} e_t^{XI}$, where p_t^{XI} is the given export/import price and e_t^{XI} the export when the variable is positive and imports when negative, enters the objective function and the optimisation problem has in addition a capacity constraint on the interconnector: $-\bar{e}^{XI} \leq e_t^{XI} \leq \bar{e}^{XI}$.

The third additional model is a model where the former hydro-based monopolist is a dominant hydro firm that faces a competitive fringe having thermal generation. For this model you should clarify the policy of the dominant firm contingent on the reaction of the fringe to choice of the dominant firm's output, starting with the behavioural rule of the fringe that it adjust its quantity such that market price equals marginal costs: $p_t = c'(e_t^{Th})$.

2. Recent estimation suggest that the price elasticity of demand based on the demand bids to Nord Pool is -0.02. Discuss the implication of such a value for the possibility of exercising market power.