

Demand Variability and Capacity Choice in oligopoly

Some comparative static results

Guy MEUNIER

CIREC

45 bis, av. de la Belle Gabrielle
94736 Nogent sur Marne France
meunier@centre-cired.fr

Among several particularities of electricity markets there are (i) demand variability, (ii) important share of irreversible cost and (iii) concentration of the production side. Given these features there are numerous concerns about the ability of liberalised markets to provide a satisfying amount of investment. The aim of this paper is to analyse the influence of these parameters (demand variability, share of irreversible cost, and number of firms) on the level of investment.

We model the investment process as a two-stage game where firms choose capacity first, and then production in each state of demand. Such framework could represent both demand variation and uncertainty if firms are risk neutral. It is commonly used to represent choice of capacity.

We characterize Nash equilibrium of this game and establish that the level of investment is increasing with respect to (i) demand variability, (ii) the share of variable cost and (iii) the number of firms. Considering the entry deterring level of investment the first two results still hold whereas the last one is modified. The entry deterring level of investment is decreasing with respect to the number of firm because of the short term intensity of competition.

This work provides some theoretic results on the relationship between industry characteristics and the quantity of capacity chosen in oligopoly. The theoretical analyse of capacity investment in oligopoly market with variable demand is a growing field of research. It is driven by the current need to better understand investment process in new electricity markets. The dynamic structure of the model allows distinguishing long term and short term market power. These distinction coupled with demand variability is at the root of the results we obtained. The relationship between long term and short term decision is essential to understand and regulate capital intensive industry.

References:

Gabszewicz, Jean J. and Poddar, S. (1997) "Demand Fluctuations and Capacity Utilisation under duopoly?", *Economic Theory*, 1997, 10, 131-147

Gollier, Christian, (1995) "The Comparative Statics of Change in Risks Revisited", *Journal of Economic Theory* 1995, 66, 522-535

Grimm Veronika and Zoetl Gregor, (2006), "Capacity Choice under Uncertainty: The Impact of Market Structure", *CORE - Université Catholique de Louvain Working Paper*, 2006, 23

Maskin, Eric S. (1999), "Uncertainty and Entry Deterrence", *Economic Theory*, 1999, 14, 429-437

Oi, Walter Y. (1965), "The Desirability of Price Instability under Perfect Competition", *Econometrica* 29, 58-64

Riberg, Richard and Martensen Kaj,(2000), "Variability and Average Profits - Does Oi's Result Generalize?", *SSE working paper series in Economics and Finance* No 40