THE OPTION VALUE OF GAZPROM’S SPARE CAPACITY UNDER THREAT OF US LNG ON EUROPEAN GAS MARKET

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Keywords: real options games, European gas markets, Russian gas strategy, gas prices, spare capacity

Abstract

As part of its policy to establish a single, competitive market for gas, one of the priorities for the European Union is to diversify its sources of supply, in the face of the oligopoly formed by Russia, Algeria, Norway and Qatar. Under these conditions, the prospect of massive US LNG experts from shale gas development is challenging the strategy of the EU’s incumbent suppliers. The structural and cyclical developments of this market - competitive market, excess supply (overcapacity of liquefaction), weak demand - have already led incumbent suppliera to adapt to maintain their market share.

The present article seeks to determine how US gas exports to Europe might change the behaviour of major incumbents and the strategic options open to them. The Russian gas company Gazprom may serve as a baseline for our analysis. With a 30% share of the EU gas market, it is a major supplier, exerting an influence on prices and enjoying several comparative advantages (Boussena and Locatelli, 2016). US LNG exports could thus compete strongly with Gazprom in the North-West Europe market, the heart of the Russian company's strategy. On the latter, Gazprom is a major player, but it is net a “price maker”, especially since most of its sales (nearly 80%) are made in the form of long-term contracts (TOP), with a price indexation formula based on those of oil. Today, the major challenge for Gazprom lays not so much in current US LNG exports as in future projects because of the resulting export volumes. This new conjoncture is forcing Gazprom to review its strategy. For the time being, with an over-supply market, the latter have simply adapted passively, mainly by revising some clauses of the long-term contracta which govern sales to the EU and more particularly by decreasing its prices (due to its low production costs, one of the main comparative advantages). However with the threat of growing competition, such strategy may not be enough to cope with the scale of US LNG experts.

Therefore, Gazprom’s strategic behaviour, in the image of Saudi Arabia in the oil market, could be to define a strategy of uncertainty about future market conditions. To this end, Gazprom has a second comparative advantage, which is that of its unused delivery capacity (in terms of production and transport). With a significant spare capacity (150 Bcm) since the beginning of 2010 and in the specific context of the European gas market - hybrid, in overcapacity and not totally globalized -, Gazprom is able to influence the evolution of prices by using it or net on the spot markets. Likewise, the spare capacity may be a strategic variable that will strengthen the context of uncertainty in which decisions concerning new LNG projects are made.

Seminal theoretical contributions (Spence (1977) and Dixit (1980)) have attempted to take into account the excess capacity and its role in competition among firms. In recent years, real-options literature (Smets (1991), Dixit and Pindyck (1994), Grenadier (1996, 1999), Boyer, Lasserre, Mariotti and Moreaux (2002, 2012), Huisman and Kort (2015)) has concentrated on the effect of uncertainty on competition and interaction between firms in a market.
With a real options games framework, we analyse the effectiveness of using the spare capacity to modify the investment decisions of a possible new entrant. We derive the optimal entry and exit thresholds, the equilibrium strategies and the option value of Gazprom's unused capacity. More specifically, we extend previous contributions through a dynamic framework where the main player has the option to use or not the spare capacity which comes with zero cost and by focusing on the value of this option and its determinants: scale of supply, production cost advantage, price elasticity, volatility and growth rate. Under the threat of a new entrant, the incumbent may adjust its volume of sales, by injecting some part of its surplus capacity into the spot market or alternatively, holding back part of its available capacity. This unusual flexibility may alter the market conditions and thus the uncertain evolution of gas prices determined by an inverse demand function.

One of the main results of our model is that the incumbent's option to use or not the spare capacity at any time can afford protection for a while, discouraging a potential new entrant. However, the use of spare capacity to permanently prevent arrival of a new entrant is not sufficient, in the sense that it is possible to delay entry but not to forbidden it. Given the greater uncertainty on market conditions, the optimal behaviour for an entrant would be to wait long enough for prices to reach a level justifying investment in the EU market. This level of prices may be altered through the incumbent's competitive advantage of holding an important amount spare capacity. If the level of prices is sufficiently high, the incumbent may inject additional capacity on the spot market in order to dissuade its competitor. Likewise, we show that the market equilibrium and trigger values change accordingly the scale of the incumbent's spare capacity used on the spot market.

By giving a positive role to the opportunity to use the spare capacity as a strategic variable under threat of a potential competitor, our article has an important practical contribution as it allows the incumbent to choose the optimal timeline and scale in order to deter entry and maximize its revenues.

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