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Liberalizing the gas industry: Take-or-pay contracts, retail competition and wholesale trade[☆]

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ABSTRACT

This paper examines retail competition in a liberalized gas market. Vertically integrated firms run both wholesale activities (buying gas from the producers under take-or-pay obligations) and retail activities (selling gas to final customers). The market is decentralized and the firms decide which customers to serve, competing then in prices. We show that TOP clauses limit the incentives to face-to-face competition and determine segmentation and monopoly pricing even when entry of new competitors occurs. The development of wholesale trade, instead, may induce generalized entry and retail competition. This equilibrium outcome is obtained if a compulsory wholesale market is introduced, even when firms are vertically integrated, or under vertical separation of wholesale and retail activities when firms can use only linear bilateral contracts.

1. Introduction

In this paper, we analyze the obstacles to retail competition in a natural gas market, bearing in mind the liberalization process implemented in Europe. Since the second part of the Nineties the European Commission has promoted through several Directives the liberalization of the main public utility markets, such as telecommunications, electricity and natural gas; the framework adopted is by and large common to these industries, and rests on the open access to the network infrastructures, the unbundling of monopolistic from competitive activities and the opening of demand.

The natural gas Directives 1998/30, 2003/55 and the third energy package in 2009 have specified the lines of reform that the Member Countries have then followed in their national liberalization plans. Although the wording is almost identical to the one in the electricity Directive 2003/54,[1] the solutions adopted in the gas and in the electricity markets concerning the organization of wholesale trades are quite different. In electricity markets, some form of organized wholesale trade has been introduced from the beginning throughout Europe, while the prevailing solution for the natural gas industry involves until recently a direct participation of producers and importers in the retail market, or bilateral trades between wholesalers and retailers with no particular attention to the organization of wholesale trades. Comparing the different measures, we can observe in the Second Directive a shift towards more effective forms of separation of the infrastructure from the upstream and downstream activities and in the third package a role for gas hubs and the development of wholesale markets.

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[1] "In order to ensure effective market access for all market players including new entrants, non discriminatory and cost-reflective balancing mechanisms are necessary. As soon as the gas market is sufficiently liquid, this should be achieved through the setting up of transparent market-based mechanisms for the supply and purchase of gas (electricity) needed in the framework of balancing requirements", EC 2003/54 (17) and EC 2003/55 (15).

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The long term contracts adopted in the industry are typically characterized by take-or-pay (TOP) clauses.[2] A TOP obligation entails an unconditional fixed payment, which enables the purchaser to get up to a certain threshold quantity of gas. This payment is due whether or not the company actually decides to withdraw (and resell) it, and further payments at a marginal price are due if the company wants to receive additional supplies. The very nature of this kind of contracts, therefore, is to substitute variable payments conditional on actual deliveries with a fixed unconditional payment up to a certain delivery threshold. With TOP clauses the structure of costs is affected, the marginal cost of gas being negligible up to the obligations and positive for larger amounts.

TOP clauses pre-exist the liberalization of European markets and are justified by risk-sharing and financial commitments when large investments in the extraction of gas and in the building of dedicated infrastructures are required. However, we argue that once the liberalization process starts, the existence of TOP obligations not only creates problems in implementing third party access to transport infrastructures, but may introduce a natural strategic incentive for firms to avoid face-to-face competition for final customers. This concern was perceived in the early stages of the discussion on gas liberalization. In a document of the House of Lords, for instance, we read that "*there was little or no gas-on-gas competition since the few importers there were had divided the market between them through a series of long term contracts characterized by costly take-or-pay clauses and supply prices based on the price of competing fuels*".[3]

Our paper shows that when wholesale trade is not developed and retailers directly bear TOP obligations, they have the incentive to target different groups of customers with neither competition nor benefits for the consumers. However, if wholesale trade develops, an impact on retail competition may arise. More precisely, we show that the creation of a compulsory wholesale market can promote retail competition even when wholesale and retail activities are not separated. Alternatively, retail competition is enhanced if wholesale and retail activities are unbundled and wholesale contracts are restricted to linear prices with unbounded deliveries. Gas release programs, instead, a measure adopted in some of the national liberalization plans, at best can promote competition only in a small segment of the retail market.

The discussion on the liberalization of the gas industry so far has focused on the development and access to international and national transport infrastructures and on the unbundling of infrastructures from the other activities of incumbent firms.[4] The 2006 Energy sector inquiry of the European Commission stresses that problems of access are still the main concern of policy makers, although in recent years some improvements have been realized. Our results suggest that there is still an element missing in the liberalization plans, and offer a set of solutions to make the development of competition in the retail market more effective.

The segmentation result can be illustrated in a very intuitive way. In a decentralized retail market organization as the one presently prevailing in Europe, retail activities require firms to select which segments of demand to approach and serve (marketing strategy), then competing in prices, while wholesale activities entail buying gas from producers or importers under long term contracts with TOP clauses, the only source of gas when domestic wholesale trade is not developed. When these activities are run within the same firm, short run price competition leads to the following outcomes: if two firms with TOP obligations target the same customers, they have the same (zero) marginal costs, and in equilibrium they obtain positive sales (and low margins due to price competition). If instead only one of the two firms has TOP obligations, the high marginal cost competitor is unable to obtain positive sales and profits in a price equilibrium. This feature of price competition with TOP obligations drives the marketing strategies of the firms. Entering the same market is never convenient because it gives low profits and leaves residual obligations to the two firms (fostering competing entries in other submarkets). Leaving a (sufficiently large) fraction of the customers to the rival, instead, induces this latter to exhaust its TOP obligations, making it a high cost (potential) rival with no incentive to compete on the residual demand. In a word, leaving the rival to act as a monopolist on a fraction of the market guarantees a firm to be a monopolist on the residual demand. In equilibrium, indeed, each firm enters a different submarket and serves the customers at the monopoly price.

The empirical evidence on the European liberalizations supports the idea that the gas market is particularly problematic, more so than electricity. The EU Commission in 2005 noted that "*Whilst the rates of larger electricity customers switching continue to rise, gas consumers … remain reluctant to exercise their right to choose. … Often competing offers are unavailable*" (European Commission, 2005). The situation is not improving much; as clearly pointed out more recently in Ergeg (2008), "Gas retail competition is almost non-existent in most member states". Switching rates (one of the few indicators of competition for final customers) are typically low. In 2007, only 3 to 4 EU countries have reported a switching rate above 1% per year. In Southern Australia, another country characterized by liberalized retail markets and take-or-pay wholesale contracts, analogous results emerge from several market surveys. For instance, in 2006 only 16% of small business gas customers received a competing offer, while the same figure rises to 54% in the electricity market (Escosa, 2006).

Going back to the EU situation, it is interesting to stress that switching rates are poorly correlated to concentration (Ergeg, 2008). For instance, in 2007 two of the relatively more fragmented markets,[5] namely Germany and Italy, displayed switching rates of about 1%, a case of entry without competition. Higher switching rates were instead observed in markets which were even more concentrated, but which were characterized either by a major role of LNG (Spain) or by the existence of an organized wholesale hub (e.g., Belgium).[6]

We acknowledge that the existing evidence of a poor development of competition in the gas market may be explained in different ways, including the persisting constraints in accessing the transportation network. However, we notice that it is consistent with our model's predictions and many elements are quite reminiscent of our segmentation story.

Once established the possibility of segmentation and monopolization of the retail markets, we move to consider additional policy measures that may contrast this outcome. We first show that gas release programs, that are adopted in several member countries to force the incumbent to sell part of its long term contracts to the competitors, at most can restore retail competition in niche markets. Developing domestic wholesale trade, instead, may affect more positively retail competition.

More specifically, we consider two alternative settings. In the first one a compulsory wholesale market is introduced, in which wholesalers have to sell their gas and from which the retailers can purchase

[2] Another difference between the electricity and gas liberalization process concerns the implementation of the general *principle of Third Party Access* (*TPA*). In gas markets a relevant exception is admitted, allowing to restrict the release of transport capacity when giving access to the network would create technical or financial problems to the incumbent because of its take-or-pay (TOP) obligations.

[3] House of Lords, Select Committee on European Communities, Seventh Report, "EU Gas Directive", 7th Report, Session 1997–1998, HL Paper 35, p8, para 15.

[4] For an extensive discussion of the liberalization process in the energy markets along these lines, see Polo and Scarpa (2003).

[5] The report by Ergeg (2008) provides data on the cumulated market share of the three largest suppliers in each country. According to these data, in 2007 this figure was 26.3% in Germany and 66.5% in Italy.

[6] In recent years, wholesale markets have been introduced in some European markets in order to ease the balancing of transport activities by providing purchase or sales opportunities when inflows and outflows do not match. There is actually a wide variety of arrangements, from physical hubs, to electronic exchange platforms to actual gas exchanges (particularly developed in Belgium, The Netherlands, the UK and more recently Germany and partially France).