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Susanna Dorigoni and Federico Pontoni

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Susanna Dorigoni, *corresponding author*, IEFE - Università Bocconi, Viale Filippetti, 9, 20122 Milano, Italy. Tel.: +39 02 58363820-1; fax +39 02 58363890; dorigoni@unibocconi.it;

Federico Pontoni, IEFE - Università Bocconi, Milano Viale Filippetti, 9, 20122 Milano, Italy. Tel.: +39 02 58363820-1; fax +39 02 58363890; pontoni@unibocconi.it;

Abstract

This article analyzes the pros and cons of ownership separation of the gas transportation network. This analysis is made with a specific test that confronts two pairs of different theoretical approaches on vertical integration. The result of this test shows that no uncontroversial solution can be offered to this problem, since all arguments (be them in favour or against) can be comfortably contrasted by a counterargument. In our view, an effective regulation would solve the problem, even though it has to be highlighted that ownership separation of the gas transportation network is not the key aspect of the gas industry. EU directives, in fact, cannot be applied where the biggest part of the value chain is produced, that is to say beyond the European borders, where an oligopoly operates. Due to its bargaining power, this oligopoly captures almost all the scarcity rent, reducing the scope for market liberalization.

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Ownership Separation of the Gas Transportation Network: Theory and Practice

Susanna Dorigoni^{*}

Federico Pontoni[†]

1. Introduction

The EU commission published, back to January 2007, a sector Inquiry concerning both gas and electricity markets[‡]. The aim of this Inquiry is to analyze the development of these two sectors as ten years have passed since the first EU Directive on this subject was published.

As for the gas sector, the Inquiry lays emphasis on some critical issues that could undermine the growth of an efficient and competitive European market. From a general point of view, a lot of things still need to be done, as the degree of implementation of the Directives is considered insufficient in most of the Member States; at the same time, the Inquiry recognizes that the Directives adopted cannot properly solve what appears to be the most urgent problem: bottlenecks due to vertical foreclosure. In particular, the Inquiry stresses that: “it is essential to resolve the systemic conflict of interest inherent in the vertical integration of supply and network activities, which has resulted in a lack of investment in infrastructures and in discrimination. It is crucial to ensure that network owners and/or operators do not have incentives that are distorted by supply interests of affiliates. This is particularly important at a time when Europe needs very large investments to ensure security of supply and to create integrated and competitive markets.”

So, vertical integration seems to be the key aspect. In particular, the EU commission believes that it can no longer be tolerated that companies operating in the gas sector can control an essential facility, namely transportation networks and distribution ones. Moreover, it pinpoints that: “economic evidence shows that full ownership unbundling is the most effective means to ensure choice for energy users and encourage investment. This is because separate network companies are not influenced by overlapping supply/generation interests as regards investment decisions. It also avoids overly detailed and complex regulation and disproportionate administrative burdens.” So, the EU Commission clearly admits that the gas market suffers from vertical foreclosure and states that legal unbundling (as required by EU directive 55/03) is not the right solution, as it cannot completely avoid any discrimination or any underinvestment problem, unless a very complex and costly regulation is put into practice. Among all possible vertical foreclosures, the EU sees the non-ownership separation of the transport system operator to be the crucial one: this vertical foreclosure is considered to be the main responsible for the malfunctioning seen both in the market and in the competition mechanisms. The Inquiry follows a precautionary principle: since only an integrated company would have the incentive to distort competition, it is essential to completely separate the network from other gas businesses.

^{*} Università Bocconi-IEFE, Viale Filippetti 9, 20136 Milano, Italy. susanna.dorigoni@unibocconi.it.

[†] Università Bocconi-IEFE, Viale Filippetti 9, 20136 Milano, Italy. federico.pontoni@unibocconi.it

That is why the Inquiry leaves no room for doubts: ownership separation is urgent and its effect beneficial. At the same time, the Inquiry recognizes that only with a new Directive Member States can be forced to adopt this new measure. A recent publication from ERGEG (2007) confirms the findings of the Sector Inquiry: “The defining element of an ownership unbundling model is that the network is operated and owned by one independent company, which clarifies the incentives, responsibilities and liabilities for the network.”

Anyway, reality is not so straightforward and economic evidence is not one way. In fact this emphasis on ownership separation lays on some questionable assumptions, which are never specified:

- Regulation is not effective in eliminating discrimination;
- Transportation networks play a key role in the natural gas market liberalisation.

As for the first point, it can be said that a well designed regulation can prevent from access discrimination to the network, no matter the ownership structure. Besides, transportation is a natural monopoly and this requires full regulation, even if the system operator is independent. In fact, independence from other segments of the industry is not enough to counterbalance the incentives to distort competition given by the monopolization of an essential facility.

As for the second point, if we take a look at the gas value chain, it is possible to see that production¹ is the most valuable step, accounting for more than half of the final price; on the other hand, national transportation has a marginal impact on what the consumer is charged (AEEG 2007). Considering that almost 60% of the gas consumed in the EU 30 comes from outside the Union, a figure that will grow up to 85% by 2030 (Dorigoni and Pontoni 2007), it can be easily demonstrated that ownership separation will be no panacea. This is due to the fact that all EU directives have no power on non-European producers. This unequivocally leads to a clear conclusion: the margins that are meant to be shrunk through liberalization are captured by non-European operators, which are not subject to EU law.

Furthermore, bearing in mind that EU Commission promotes TPA exemption as the proper tool to boost investments on new international supply infrastructures, it is not even clear why at the same time it suggests that the opposite measure (ownership separation) would bring the same effect on the national network. This complex scenario leads, inevitably, to further research.

The paper is organised as follows: in section 2, the EU Directives on the subject are reviewed; in section 3 an attempt is made to see whether the economic theory is so uncontroversial about the validity of the ownership separation; in section 4 a comprehensive scheme is presented in which all the pros and cons (of the ownership separation) are emphasized; section 5 will be devoted to look at the situation as it is today; section 6 deals with empirical experiences, and the ISO model is discussed in section 7.

¹ Together with international transportation to which ownership separation cannot be applied.

2. EU legislation

In this section the two EU directives (COM/30/98; COM/55/03) concerning the gas market are reviewed, with a particular focus on their provisions about networks. Then also regulation EC 1775/2005, which sets the conditions for the TPA, is discussed.

Traditionally (Percebois 2003; Chevalier and Rapin 2004), it is possible to say that the liberalization of the energy sector stands on three pillars. The first one is the Rome Treaty which clearly promotes the implementation of a single (competitive) European market, leaving no justification for public monopolies. The second pillar is an economic one, which states that monopolies are inefficient (Percebois 2003) and that they are able to capture the whole surplus generated. The third and less straightforward pillar is the idea that only competition can lead to security of supply. Let's now move to a brief analysis of the legislation and the tools chosen to liberalize the market.

The key objective of the first directive (COM/30/98) was "to provide fluidity in gas flows and improve security of supply and industrial competitiveness". In particular, the most important aim was the creation of a gas (to gas) competition, in order to allow the development of a real market price set by the interaction of supply and demand. This goal was to be reached by a set of common rules concerning all aspects of the gas industry. The fundamental rules were: market opening, that is to say the possibility for eligible customers to switch to suppliers different from the national incumbent operators; unbundling of the internal accounts of integrated gas companies, in order to provide transparency and to avoid any market distortion; designation of a competent authority, with the responsibility to harmonize all technical rules, a very important step toward market integration. The last and more important rule was the third party access (TPA). It was understood that to be effective, the liberalization process had to offer all operators the same conditions of access to the network through impartial, non-discriminatory and transparent management. So the Directive obliged the network operators to grant TPA, under the strict supervision of a competent authority. The first Directive, however, gave the possibility to choose between regulated TPA and negotiated TPA.

After just five years, the EU Commission understood that this first Directive had some serious faults, mainly concerning what appeared to be the most important obstacle to the development of a competitive and more secure market: vertical foreclosures. The legislator, of course, already knew that vertical foreclosure could have been a problem, but the measures originally adopted were insufficient to solve it. In particular, it is clear from the really brief summary above, that two were the provisions not strict enough to obtain the results of a vertical disintegration. First of all, the type of unbundling chosen (merely separation of internal accounts) was too weak to guarantee non-discrimination (Hardt 1995). Then, the possibility of negotiated TPA left too much room for non transparent agreements. These two distortions were corrected with a new Directive, namely COM/55/03, which contains also a set of additional common rules. This Directive forces all incumbents on the transport network to have separate legal accounts for this particular activity (the principle of "one legal entity per activity") and leaves no

possibility for operators to negotiate transport tariffs, increasing consequently the powers of the regulatory authorities.

Before taking a deeper look at the directive, it is useful to analyze the various possibilities for the management of the essential facility. As for vertical disintegration, the IEA publication (2000) is the document of reference, in which a classification of different types of separation can be found. The first and least invasive one is the accounting separation, which is extremely easy to be put into practice but it leads to very poor results (Hardt 1995). The second one is the functional separation, which leads to a complete separation of every business unit within the same firm. The third one is the operational separation, which obliges the creation of as many legal entities as the number of businesses the integrated operator is carrying out. This type of separation is considered the most suitable one, as it reduces the risk of discrimination without compromising any property right previously acquired by any operator. The fourth and strongest type of separation is the ownership one, which forces the owner to sell part of its activities; in any case, ownership separation has to be considered an extreme measure, since one of the basic principles of a market economy is the respect of any property right.

A more specific document (OECD 2001), concerning the management of the essential facility in a liberalized market, was also taken into account for the composition of the Directive. This publication analyzes three different types of system operator in terms of ownership and management. The first solution proposed is an operator whose owner is interdicted from entering any other segment of the industry, thus avoiding any problem of discrimination. In the second case we have a system operator whose shares are held by all the operators competing in the other segments of the market. This type of ownership, though, can facilitate the creation of a cartel (Baranes *et al.* 2003). The third one is the creation of an independent system operator (ISO) that manages the network. In this case, the ISO cannot be owned by anybody operating in the market, but, at the same time, the ISO is not the owner of the network, whose property still remains in the hands of the former integrated operator.

Let's now take a deeper look at all the articles concerning the transport network in order to see exactly the solutions adopted by the European legislator. First of all, article 7 requires that all Member States have to designate a system operator for every essential facility that can become a bottleneck to the market. In particular, since the transport network is a natural monopoly, the designation cannot last forever, but has to be renewed after a certain period of time, whose duration can be determined by each Member State. Article 8, instead, confirms all the principles of non-discrimination among operators and eliminates the possibility of a negotiated TPA, giving authorities full power to tailor the best cost reflective tariff. As for article 9, full legal unbundling is required, as no operator can be active in more than one segment of the value chain. The new legal entity "shall have effective decision-making rights, independent from the integrated gas undertaking, with respect to assets necessary to operate, maintain or develop the network". More, it also demands that: "those persons responsible for the management of the transmission system operator may not participate in company structures of the integrated natural gas undertaking responsible, directly or indirectly, for the day-to-day operation of the production,

distribution and supply of natural gas”. All these provisions are clearly made to commit every system operator to full impartiality. It is possible to say that these three articles are strict and precise: by combining them with article 25 (that is to say, the one concerning all activities of the regulatory authorities), ownership separation seems needless. Article 10, though, obliges each system operator “to preserve the confidentiality of commercially sensitive information obtained in the course of carrying out its business, and prevent information about its own activities, which may be commercially advantageous, from being disclosed in a discriminatory manner.” While it is normal that the system operator communicates its own activities in a non-discriminatory manner (and the regulatory authorities are there as watchdogs), the legislator also recognizes that every system operator naturally obtains information that could give advantage to anyone who possesses them². Since it is more difficult to control the utilization of this type of information, as they are gathered during everyday business, the legislator had to decide between complete disclosure, with the consequence of avoiding any risk, and confidentiality, with the consequence of dramatically increasing the work of the authorities. By choosing confidentiality over disclosure (a decision maybe forced by privacy matters), the legislator has left an extreme risk of unfair competition, even though it clearly prohibits any fraudulent utilization of the information gathered. The unfair competition problem rises if the system operator passes this information to any player in the market; obviously, if the system operator is owned by a company that operates in the market, the risk of fraudulent communication of such information is much higher.

After these two Directives, the EU adopted regulation EC 1775/2005. This regulation sets forth the conditions for the access to the natural gas transmission networks. The instrument adopted (regulation) has been chosen in order to further harmonize the rules concerning all European networks. In fact regulation is a legislative act which becomes immediately enforceable as law in all Member States simultaneously. So, it can be distinguished from directives which require Member States to achieve a particular result without dictating the means of achieving that result (with the consequence that in any Member State we can find a different set of rules). The need for harmonization in transportation rules is very strong, since they are as important as physical interconnections for the achievement of an integrated European market. The harmonization of access conditions throughout Europe reduces transaction costs as operators find similar procedures when entering any European market. The regulation is mainly derived by Directive 55/03, as it specifies how to manage the network in a non-discriminatory and transparent manner.

The new Directive proposal, which is meant to amend Directive 55/03, reinforces TSO’s independence by stating that Member States shall ensure that each undertaking owning a transmission system acts as a transmission system operator; and the same person or the same persons are not entitled to: directly or indirectly exercise control over an undertaking performing any of the functions of production or supply and to hold any interest in or exercise any right over a transmission system operator or over a

² In particular, as it is responsible for the physical delivery of gas, the system operator knows every consumer’s profile, the most important information that a seller would like to know.

transmission system. Moreover, the same person or the same persons are not entitled to: have shareholder's minority blocking rights on issues of strategic importance, in particular with respect to assets necessary to operate, maintain or develop the network in both an undertaking performing any of the functions of production or supply and a transmission system operator or a transmission system³. As for unbundling, article 9c, confirming Directive 55/03 provisions, states that transmission system owners and storage system operators which are part of vertically integrated undertakings shall be independent at least in terms of their legal form, organisation and decision making from other activities not relating to transmission and storage.

To sum up, the European legislator has opted for operational separation of the system operator without any limit to its ownership structure. Furthermore, the legislator has harmonized the conditions of access throughout Europe. But again, after just four years, the Energy Sector Inquiry laments a lack of competition and calls for ownership separation, as vertical foreclosures are still there. It is time to review what theory says about vertical integration.

3. Vertical relations and Economic theory

In this section the theory of vertical relations will be reviewed, with its definitions, all its key aspects and remedies. An effort is then made to see the gas industry through this lens and to analyze some papers, questioning their findings.

When talking about vertical relations, the reference goes both to vertical integration and to vertical foreclosure. Let's define them both. Vertical integration is "the organization of successive production processes within a single firm, a firm being an entity that produces goods and services" (Riordan 1990). For better understanding, a firm can be seen as a unified ownership of assets used in production (Grossman and Hart 1986), or as a nexus of contracts linking its owners to production factors, managers, and creditors (Jensen and Meckling 1976). A clear example is made by Riordan (2005) "Consider a supply chain in which raw materials and other inputs are used to produce an intermediate good, which in turn is a component input into the production of a final good, which in turn is distributed to consumers through a retail channel. Forward vertical integration occurs when a firm expands the scope of its activities to both produce and distribute the final good".

Foreclosure, instead, refers to a dominant firm's denial of proper access to an essential good it produces, with the intent of extending monopoly power from the segment of the market to an adjacent segment (Rey and Tirole 2003). A foreclosure can be considered a vertical one, when the essential facility is upstream (or downstream) with respect to the competitive segment. For the sake of precision we will also define essentiality. Essentiality means that the dominant firm's product cannot be (easily) duplicated by those who are excluded from its utilization. This type of foreclosure, also known as

³ Article 7 of the Directive proposal.

Essential Facility Doctrine, states that the owner of such a facility has incentives to monopolize downstream (or upstream) segment as well (Rey and Tirole 2003).

Vertical integration and vertical foreclosure are unequivocally correlated. Every time a firm decides to integrate either upstream or downstream, competition authorities investigate the possibility that such operation raises barriers to the market. Vertical integration, though, could also bring efficiency gains, which would have beneficial effects for consumers. That is why if anyone wants to assess the effects of a vertical integration should use proper theoretical tools. The reference goes here to Riordan's taxonomy (Riordan 2005) as a good way of proceeding. His classification of different theories concerning vertical relations is both a summary of the literature and, as it will be shown later, a useful test in assessing vertical integration effects. According to Riordan, there exist two theories in favour of vertical integration and two against. The two in favour are:

- Single Monopoly Profit (SMP): this theory contends that an upstream monopolist protected by durable barriers to entry can claim a monopoly profit but once. If an upstream monopolist can use contracts to extract fully a monopoly profit from a downstream market, then there is no role for vertical integration to play in leveraging monopoly power to obtain any additional profit. In this case, vertical integration occurs for other reasons than monopolizing a market. The intuition that lies behind this theory is that a monopolist has enough power to regulate the whole industry without necessitating any integration. So if it does decide to integrate, there must be some efficiency purposes.
- Eliminating Double Marginalization (EDM): this theory recalls a work from Spengler (1950), in which it is shown that the vertical integration of successive monopolies eliminates the problem of a double marginalization and results in a lower price of the final good. In this case the integration has beneficial effects on both profits and consumer price.

On the other hand, we have two alternative theories against vertical integration which can be described as follows:

- Restoring Monopoly Power (RMP): a new theory concerning vertical foreclosure counters the single monopoly profit by arguing that an inability to make enforceable multilateral commitments prevents an upstream monopolist from using contracts to extract monopoly profits from a downstream industry. In this case vertical integration helps overcome the commitment problem so to restore monopoly power (Rey and Tirole 2003). This theory moves from the Coase conjecture, which states that a monopolist playing multistage games cannot impose its contractual power to customers, since it has too many incentives to deviate from its original commitment. From this argumentation, Coase affirms that monopolies should not be considered as a major antitrust problem.
- Raising Rivals' Costs (RRC): a vertically integrated firm might artificially augment rivals' costs by raising the price of the essential input (Salop and Scheffman 1987; Riordan

1998). Scarcity is here indicated by an upward sloping curve for a competitively supplied input, meaning that a positive shift in demand elicits an expansion of supply only at a higher price.

This taxonomy, even though it is not exhaustive, is extremely interesting since it gives a proper tool for analyzing vertical integrations. Two tests can be imagined:

- RRC vs. EDM: this analysis has the objective to discover if the efficiency gains can offset possible increases in industry costs (for competitors).
- RMP vs. SMP: it is necessary to consider the bargaining power of all the players in the market, in order to understand whether the vertical integration would change the equilibrium in an inefficient way.

It is worth specifying that in these tests the strict content of the presented theories is relaxed insofar as their objective consists in stating the opportunity of vertical integration according to the balance between costs and efficiency gains associated with vertical integration, or the balance between the monopolist's and the competitors' bargaining power.

These tests are extremely interesting, since they permit the valuation of the key aspects of a vertical integration: the bargaining power and the overall effect on industry costs. By assessing the bargaining power of the new firm, it is possible to imagine whether it will be able to impose prices, technological standards and all other types of foreclosures. When assessing possible efficiency gains, it is important to see whether a cost reduction experienced by the new firm will not result in a cost increase by all other firms (for example a higher tariff for the essential facility acquired).

At this point it is worth trying to read the arguments usually brought about in favour or disfavour of the ownership separation through the theoretical lens it has just been outlined. Before doing that it is fundamental to emphasize the main limits of the above mentioned theoretical contributions that emerge in applying them to the gas market.

The gas industry can be divided into three segments: production, transportation, and sale⁴. In this simple division, the network can be seen as the essential facility needed by both producers and sellers. Theoretical analysis, though, generally considers the gas market as composed by just two segments: the network and the competitive downstream market (Vickers, 1993; Buehler et al. 2004; Cremer et al. 2006); only in Baranes *et al.* (2003), a three-segment structure is presented. The exclusion of the upstream segment seems to be crucial for competition in the market and reveals that the focus on the other two segments is due to the fact that economists consider all network industries to be the same. The exclusion of production from theoretical analysis concerning vertical integration and vertical foreclosure could bring to misleading results.

The exclusion of the upstream activity might lay on some implicit assumptions:

- Production is (or can be forced to become) a competitive market;
- The most valuable segment of the market is the downstream market;

⁴ Actually, there are 5 segments: production/import, transportation, storage, distribution and sale. For modelling reasons, though, we can unify transportation, storage and distribution into just one segment.

- Producers have no specific advantage in controlling the network;

But, what if competition in the upstream segment does not exist and cannot be imposed by any authority? What if the downstream market is not the most valuable part of the chain? What if producers have a clear advantage in controlling the network? Well, if any of this supposition is true, then it is vital to analyze the whole structure of the gas industry, because the reasons for the lack of competition might be found in other segments, namely production. In fact, the three assumptions are definitely false. Production is managed by a non-European oligopoly, with Russia (through Gazprom) playing a leading role. Apart from the fact that competition, as stated by the economic theory, should occur among producers and not among importers (i.e. the European national incumbents)⁵, it is worth remembering that more than half of the gas value chain can be found upstream, beyond the European border. In other words, producers are the ones who get the scarcity rent, or at least the most part of it. This is due to the international gas pricing mechanism, namely the netback value pricing.

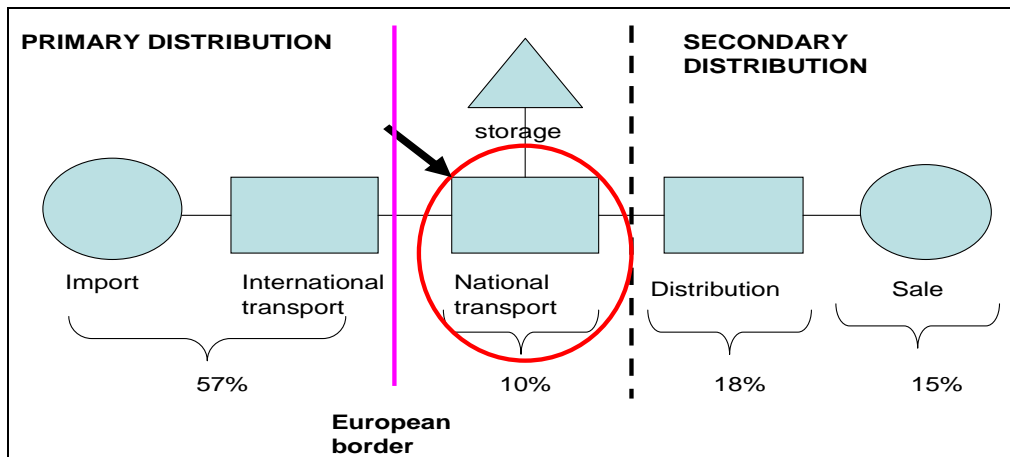


Figure 1: The natural gas industry structure in Europe.
Source: Authors' elaboration on AEEG data, 2007.

According to this mechanism, the international price of gas is set in between the cost plus value, which is the sum of the extraction and the international transport costs, and the value that natural gas has on the final market. The latter is represented by the price of the cheapest alternative fuel minus the cost of national transport, storage and distribution of gas itself. The difference between the netback value and the cost plus value is therefore a rent that is shared among exporters and importers according to their bargaining power. The bargaining power of producers, that are less numerous of importers, is stronger. This is the reason why producers get the most part of the rent and why the highest share of natural gas price stays beyond the European border. This calls for the introduction of countervailing power theory. Countervailing power was a term coined by Galbraith (1952) to describe the ability of large buyers in

⁵ The liberalisation Directives seem to focus on this type of competition.

concentrated downstream markets to extract price concessions from suppliers. Galbraith saw countervailing power as an important force offsetting suppliers' market power.

The concept of countervailing power was controversial in Galbraith's day (see Stigler's 1954 criticism), and continues to be so today. There are a number of theories explaining why large buyers obtain price discounts from sellers. A simple theory is that the cost of serving large buyers is lower per unit. For example, if the supplier's production function exhibits increasing returns to scale (as the one of a gas producer does) and the supplier serves one buyer at a time each production period, per-unit production costs will be lower when serving a large buyer.

A literature including Horn and Wolinsky (1986), Stole and Zwiebel (1996), Chitty and Snyder (1999), Inderst and Wey (2003), and Raskovich (2003) considers a model in which a monopoly supplier bargains under symmetric information separately and simultaneously with each of a number of buyers (this is the case of gas). Each buyer regards itself as marginal, conjecturing all other buyers consummate their negotiations with the supplier efficiently. If aggregate surplus across all negotiations is concave in quantity, the marginal surplus from a transaction involving a large quantity is higher per unit than from one involving a small quantity. This higher per-unit marginal surplus for large buyers translates into a lower per-unit price. The aggregate surplus function would be concave, for example, if the supplier has increasing marginal production costs (namely the case of Russia).

Size discounts also emerge if large buyers' outside options are better. In Katz (1987) and Sheffman and Spiller (1992), for example, the larger the buyer, the more credible becomes its threat of integrating backward and producing the good itself⁶. Size discounts also emerge if the supplier's outside option is worse when facing a large buyer. In Inderst and Wey (2004), for example, if bargaining with a large buyer breaks down, it is difficult for the supplier to unload this large quantity on other buyers since this involves marching down these other buyers' declining marginal surplus functions.

As for the third assumption, we can say that a producer who owns the network can clearly discriminate access, as any other operator owning an essential facility. This can occur especially if a producer is integrated in the downstream market⁷.

So if the Sector Inquiry laments a lack of competition due to vertical foreclosure, it should be argued that the problem with the gas market liberalisation has to do with the upstream segment.

More particularly, competition down the European border is not sufficient to guarantee a decrease in the final price paid by consumers. In fact, in a situation where many European importers face a sole exporter, who is likely to practice the same price to every purchaser, the competition for the scarcity rent would turn in favour of the latter. This situation is likely to be emphasised by the liberalisation process

⁶ Note that Eni, the Italian gas incumbent, signed several agreements with Gazprom to exploit gas fields in the Caspian Area and is also planning to get involved in the realisation of a big liquefaction plant in the Middle East.

⁷ This is the case of Gazprom that is free to sell directly on the Italian final market. The Russian gas giant offered Eni the abolition of destination clauses as compensation. Destination clauses formerly prevented the Italian incumbent to sell the gas purchased from Russia outside its national borders.

which will lead to the pulverization of importers turning into a context in which the monopolist (producer) deals with several players, further increasing its countervailing power compared to a situation in which it had to face a monopsonist for each Member State⁸.

ERGEG (2007), too, recognizes that the gas industry has some specificity that calls for more sensitivity when evaluating the need of ownership separation. ERGEG, in fact, recalls the importance of producers and external players (beyond EU borders) and suggests the Legislator to consider this crucial point whenever a new Directive is discussed.

Last but not least, it is worth noting the total absence (in the considered theoretical contributions) of any analysis concerning the cost of a disintegration process. The de facto situation of the industry is that it is vertically integrated, while all theoretical analysis considers that in the initial situation there are only disintegrated companies or, at least, that there is a non significant cost problem when considering disintegration. Is that true? Let's make an example: if the incumbent is obliged to sell its network activities, it is crystal clear that someone has to buy them. Given that this new system operator would probably borrow at least a part of the money needed for the acquisition, the market would be left with a new fundamental player with debts to pay. Would this be optimal for investment decision? Again, this is questionable. In fact, the regulatory authority would have to consider the system operator's passive interests (which are a part of its costs) when calculating the tariff and the remuneration of its new investments. This calls for further research on disintegration costs.

4. Ownership separation (OS): pros and cons

Let's now try to assess the pros and cons of ownership separation. We will propose a comprehensive scheme in which we will classify the arguments in favour or against such measure. This tool is aimed at bringing together theory and practical issue that were common to many analysis and research projects (Dorigoni 2007).

This scheme tries to analyze from a concrete point of view what are the real causes that could lead to ownership separation and the arguments that, instead, seem to discourage it. The scheme is organized as follows: in the first column the arguments in favour of ownership separation are presented; in the second column the arguments against are proposed; the third column contains the right test, RRC vs. EDM (test n. 1) or RMP vs. SMP (test n. 2), to apply to each couple of issues, thus resulting in recommendations to regulatory authorities. After each couple of arguments correlated considerations are reported.

	PROS	CONS	TEST
1	OS eliminates any possibility of price discrimination in the access to the network.	OS would result in an increase of transaction costs.	RRC-EDM

⁸ At the other end of the value chain, (with respect to production), down the European border, liberalization has brought many operators in the gas market. This has given producers the possibility to choose their partners, since in any country there is more than one operator in the competitive final market.

<i>No price discrimination is possible since transport is a regulated business and the access tariff is decided by regulatory Authorities. On the other hand, the benefits granted by a transparent SO could offset transaction costs.</i>			
2	OS eliminates the possibility of any access discrimination in favour of the incumbent.	OS causes a rise in reliability costs associated with the network management (extra-capacity, line-pack, sales monitoring, etc.).⁹	RRC-EDM
<i>Discrimination as for access to the network is illegal and prohibited by the Energy and by the Antitrust Authorities who are in charge for avoiding dominant position abuses. Moreover an efficient non-price regulation should be able to eliminate this risk. On the other hand, this extra-cost could be offset by efficiency gains arising from increased competition on the grid.</i>			
3	OS avoids the risk that the integrated company practises cross-subsidisation by exploiting its monopolist position in the network activity.	OS would reduce incumbent's rating since it would lose a profitable asset.	RRC - EDM
<i>With legal unbundling and regulated tariff, such subsidization is improbable. Anyway, the liquidity coming from the sale could be reinvested even though (likely) in more risky activities and supporting transaction costs.</i>			
4	OS avoids that the network company releases information about competitors and consumers (e.g. load factors) in favour of its consociate active in the sale activity.	OS would lead to a loss of important economies of scale and coordination with other segments of the value chain.	RRC-EDM
<i>This practice is illegal thus prohibited by law. Moreover, an efficient transport quality regulation, in terms of information sharing and transparency, would eliminate the information rent of the incumbent. There is the risk of discrimination that could raise rivals' costs. In a regulated industry, coordination is guaranteed by authorities.</i>			
5	OS would favour (over)investment in transport capacity that would clearly benefit final consumers. An integrated TSO could under-invest in order to favour its dominant consociate (often the undertaking holding take or pay contracts¹⁰). Besides, congestion can produce scarcity rents that would increase the vertical integrated company competitiveness on the final market.	If OS would result in the creation of an Independent System Operator, we would have a duplication of operators and cost (Vickers, 1993).	RRC - EDM
<i>The level of investment depends upon its convenience that is on the revenue (i.e. Cost of capital) granted by the regulatory Authority. Secondly a capacity excess would generate system costs to be beared by the network users. It is worth mentioning that the increase in transportation costs could be offset by the decrease in price due to increased competition, which is very difficult to assess. But who should be responsible for stating the right level of investments (break-even)? The cost increase should be balanced with benefits coming from non discrimination (i.e. increased competition).</i>			
6	OS favours new interconnection investments while an integrated SO could prefer the status quo, since generally incumbents have destination clauses and could be not interested in	OS would prevent the incumbent to present itself abroad as a vertically integrated company, since it would lose "valuable transaction-specific assets"	RRC-EDM

⁹ See Lyon and Hackett 1993. The customers that pay for reliability are those who show an inelastic demand curve (i.e. in those uses where gas has no substitutes).

¹⁰ Take or pay contracts represent the main way in which gas is contracted between producers and importers. Their features consist in: duration, which can be up to 30 years and minimum off-take obligations (take or pay) by the purchaser. These contracts are in fact an answer to the so-called "hold up" problem arising in case of specific investments such as pipelines (Williamson 1985).

	market integration.	(specialised knowledge), important for credibility in contracting with producers. Its bargaining power would therefore be reduced.	
<i>New interconnection investments are connected with security of supply. This issue is important also for the vertically integrated company at least in terms of reputation. Besides, new interconnection investments can be promoted also by new entrants, while the network company would be obliged to adapt the national grid by consequence. There is no empirical evidence of how an incumbent could lose contracting power.</i>			
7	OS would eliminate the incentive of the network owner to extract monopoly profit in the downstream market, diminishing the role of the authority.	OS would not eliminate the bargaining power of the new network owner, who would still need to be fully regulated.	RMP-SMP
<i>The problem with a vertically integrated company is based on the fact that it can use its monopolistic position on the essential facility to gain the whole surplus generated in the downstream market. On the other hand, we know that with a two part tariff an independent operator would be able to do the same. This calls for full regulation.</i>			

Tab. 1 Pros and Cons of Ownership Separation (OS)

Source: Authors' own elaboration.

As shown in the tables, pros for OS are as much numerous as cons. Moreover, every issue (be it positive or negative) can be easily contrasted. This means that there are no uncontroversial arguments in favour (nor in disfavour) of OS, making it difficult to get a stand on this point.

As for the first couple, test number 1 should be applied with reference to the raise in rivals' costs due to price discrimination and in the efficiency loss caused by transaction costs.

Test number 1 is also suitable for the second couple: access discrimination (discrimination in non-price conditions) would result into an increase in competitors' costs. On the other hand, OS would generate an increase in the reliability premium paid by consumers with rigid demand¹¹. Test number 1 is justified also for the third couple if considering that by means of cross-subsidisation the incumbent is in a position to reduce its costs on the final market, implicitly raising the costs of new entrants, and that the decrease in the company's rating would augment the cost of its activities (WACC)¹².

Again, test number 1 is suitable for the fourth couple insofar as the vertically integrated company is granted an informative rent from which competitors are excluded and as the loss of economies of scale and coordination would cause an efficiency loss.

Finally test number 1 applies to both the fifth and the sixth couple: as for the fifth it is worth emphasising that congestion raises rivals' costs (while the incumbent holding take or pay contract would get access anyway or even at fairer conditions) and that, on the other hand, the duplication of operators leads to an increase in overall costs (Vickers 1993).

¹¹ Note that, with reference to the diffusion of gas oriented technologies for power generation, almost the whole gas market is becoming captive.

¹² Weighted Average Cost of Capital.

As for couple six, it has to be stressed that, as above, under-investment could cause an increase in competitors' costs, and that OS would augment procurement costs¹³.

Test number 2 applies in the last case (couple seventh). In fact, the network owner excluded from the downstream market by OS does not have incentives to distort competition in that market. On the other hand it can be argued that the network company could extend its monopoly power (leverage theory) also without being vertically integrated¹⁴.

Under an empirical point of view, it seems to the authors that it is worth concluding this section by focusing on the main concerns about vertically integrated undertakings in the natural gas market. They are represented by the possible raise of an (under)investment problem on the grid, and by access discrimination. One of the most important topics to investigate consists in security of supply. Security of supply can be achieved only with investments in new infrastructures that could bring a sufficient¹⁵ amount of gas to final consumers. The EU is worried that vertical integrated firms have less incentives to invest in infrastructures. This underinvestment problem would raise barriers to entry, thus configuring a Raising Rivals' Cost scheme, and, at the same time, would reduce security of supply. Two interesting papers (Buehler et al. 2004; Cremer et al. 2006) analyze this issue and demonstrate that, contrary to common thoughts, only integrated operators have more incentive to invest. They unequivocally suggest not continuing on the road that leads to ownership separation. Their findings are based on the fact that, if the system operator is excluded from the profits gained in the final market, it will have no incentive to make the optimal network investment (both in size and quality). This is a typical vertical externality argument which states that a non integrated upstream monopolist ignores the positive effects on downstream profits. Nevertheless these two papers make some non realistic assumption on the gas industry. In fact, their findings are correct only in a deregulated environment (Buehler et al. 2004) or where authorities just regulate the access tariff to the essential facility. Actually the gas network is fully regulated, also with respect to investment remuneration and timeline. Their conclusions, though, can still be considered as a caveat by regulatory authorities, which have to find the right incentives for the investments needed. Moreover, it is possible to say that these papers remind us the need for regulation whenever there is an essential facility (be it integrated or not) that can become a bottleneck to the market.

But do we still need to fear foreclosure (access discrimination) if the operator is fully regulated? In such a case the foreclosure cannot be put into practice, unless a consistent information asymmetry exists (Vickers 1993). This states the uselessness of OS in case of efficient price and non-price regulation on the network, unless the information asymmetry would persist or if it would be too costly to reduce it. It is then worth noting that, even in case of OS, the market would be left with a new operator benefiting of this asymmetry. Besides, as argued by Polo and Scarpa (2003), it is normal that information asymmetry

¹³ That is the price of gas to be paid by exporters.

¹⁴ For instance through a two-part tariff.

¹⁵ Sufficient to cover demand.

will reduce (and perhaps disappear), given that authorities quickly move on the learning curve. The reduction (elimination) of the information asymmetry would reduce the chance of discrimination, shrinking (eliminating?) the benefits of ownership separation.

5. Unbundling of the system operators: the situation today

It is now time to take a look at the situation of the ownership structure of transport system operators in the main European Countries. We will refer to the EU 15 for two reasons: on the one hand, it comprises the first Member States to have implemented the Directives; on the other hand they account for almost the totality of the European gas consumption.

In the table hereunder, the system operator, the type of unbundling and the main shareholders are presented. In the last column (type), it is specified whether the main shareholders are the incumbents on that market. The latter situation is indicated with an “I” if they are the incumbents, otherwise a blank space is left.

Table 2: Ownership Structure – EU 15.

COUNTRY	SYSTEM OPERATOR	UNBUNDLING	SHAREHOLDERS	%	TYPE
Austria	OMV Gas	Legal	OMV Gas International	100%	I
Belgium	Fluxys	Legal	Suez	57%	I
Denmark	Energinet	Ownership	Danish State	100%	
Finland	Gasum	Functional	Gasum	100%	I
France	Grt Gaz	Legal	Gaz de France	100%	I
Germany	E.On Gastransport	Legal	E.ON	100%	I
Germany	RWE Midstream	Legal	RWE	100%	
Germany	Wingas Transport	Legal	Wingas	100%	
Greece	DEPA	Functional	DEPA	100%	I
Ireland	Bord Gais	Functional	Bord Gais	100%	I
Italy	SNAM Rete Gas	Legal	ENI	50,1%	I
Luxemburg	Soteg	Functional	Soteg	100%	I
Netherlands	Gas Transport Service	Legal	Gasunie	100%	I
Portugal	Transgas	Legal	GALP	100%	I
United Kingdom	National Grid	Ownership	Investment Funds	35%	
Spain	Enagas	Ownership	Gas Natural	5%	I
			Investment Funds	40%	
Sweden	Nova NaturGas	Ownership	Statoil	30%	
			E.ON Ruhrgas	30%	
			Fortum	20%	I
			DONG	20%	

Source: Authors' elaboration on Bureau Van Dijk data, 2007.

The situation is quite simple: apart from United Kingdom, where network unbundling started even before the Gas Act (1996), there are just two countries which have opted for ownership separation: Spain and Sweden. As for Denmark, the ownership has been acquired by the Danish State and it is questionable whether the nationalisation of essential facilities was the target of the Directives. Moreover, we can say that only in the United Kingdom, none of the shareholders is involved in any other gas undertaking, while in all other countries their incumbents participate in the network. Let's now analyze the property structure of Enagas and Nova NaturGas. As for the Spanish operator, we can see that the former incumbent still owns 5% of the shares. This is a small participation; still Gas Natural is the only shareholder to have stakes in the gas industry. On the other hand, Nova NaturGas is owned by four gas operators, who all have stakes in the Swedish market. Statoil sells its gas to Sweden, while Dong and E.ON have activities both in distribution and in commercialization; Fortum, instead, is the biggest Swedish consumer. Thus, the structure of the shareholding resembles a cartel.

As for all other Member States, there are four of them which have not even put into practice directive 55/03 (Finland, Ireland, Greece and Luxemburg), while the rest has adopted legal unbundling. Among these, we find that in seven cases the former incumbent still owns 100% of the shares, while in Italy and Belgium the ex vertical integrated company owns a percentage that clearly guarantees the complete control, respectively 50% and 57%.

From this brief analysis, it is clear that ownership separation, as it is intended by the EU Commission, exists only where the market faces a different structure: UK, in fact, was a net exporting producer at least up to 2005. This leads to a different evaluation of the UK market compared to all other EU markets (SERIS 2006), and recalls what said before with reference to the upstream segment of the gas industry.

6. Ownership separation: the empirical evidence

The cases of network ownership separation in the UK gas industry and in the Portuguese electricity sector will be here briefly presented¹⁶.

As for the latter it is necessary to point out that up to 1995 the grid was vertically integrated within the generation society (EdP). It took 4 years to implement the legal separation: at the end of the process an independent society was created (REN). In 1999 the Energy Regulatory Authority was established (ERSE), and in 2000 REN was sold for the sake of ownership separation.

It is worth investigating the effects of ownership separation as regards access tariffs, investments and quality of service. The choice of these three variables is not casual since one of the main goals of ownership separation consists in network optimisation that is in the degree of utilisation of capacity, in the number of access to the network, in the balancing system, in the tariffs trend and in investments, including those in quality. As for the degree of utilisation of capacity, it is not possible to question since

¹⁶ The authors are aware of the differences characterising the gas and electricity sectors. Nevertheless, as far as ownership separation of the network and its effects (in terms of investments, tariffs and quality of service) is concerned it is possible to sustain the comparison.

there are no available data, witnessing a complete lack of transparency. As for access to the network the Commission Benchmarking Report¹⁷ does not report exactly on this issue. Nevertheless it is worth mentioning that electricity volumes (with respect to total consumption) traded in exchanges or in standardised OTC (Over the Counter) markets are definitely below the European average, and that concentration in generation is higher than the average, the same being on the retail market. Finally, electricity prices for industrial, commercial and households consumers are higher than the average European price. As for the balancing regime, it should be noted that Portugal appears among those countries in which balancing is not considered as “favourable” but just “containing favourable elements”.

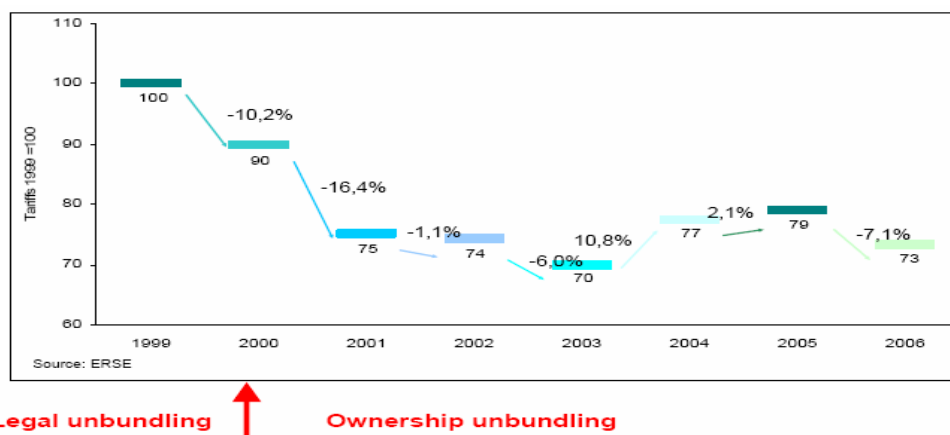


Figure 2: Electric transmission tariffs in Portugal.
Source: ERGEG, 2007

As far as tariffs are concerned, it should be noted that sensitive decreases in tariffs were due to the Energy Authority establishment, rather than to ownership separation. The regulatory Authority introduced, in fact, a tariff regulation based on efficient costs, while before tariffs were freely set by the integrated company.

As previously noted, one of the main advantages of ownership separation is claimed to be represented by the increase in investments on the grid. Taking a look at the Portuguese investment dynamic between 1994 and 2006, it is possible to develop the following considerations: the level of investments declined gradually during the vertical integration and legal unbundling stages and increased under ownership unbundling. Nevertheless the increase is mainly explained by investments related to new requirements such as regional integration and by the incorporation of renewable energy sources.

Finally, as for quality of service, it is possible to underline that network losses decline gradually over the full period, as the average interruption time indicator does, showing that quality improvements are not necessarily affected by ownership separation.

¹⁷ Fourth Benchmarking Report 2005.

As for the UK, the European Commission argues in its Energy Sector Inquiry¹⁸ that “the UK market experience of full ownership unbundling suggests that it significantly changes the behaviour of the transport undertaking: a fully unbundled TSO will focus on optimizing the use of its network”. So, also in this case the attention will be focussed on tariffs and investments according to the available data.

In the meantime it is necessary to recall the historical background: the Gas Act, published in 1996, stated the necessity of legal unbundling for all the segments of the gas industry; the demerger of the supply function of British Gas into Centrica occurred in 1997; the demerger of transportation into the Lattice Group (Transco) took place in 2000. In 2002 Transco merged with National Grid, the electricity network operator.

The ownership unbundling of British Gas into Transco and BG plc was not the result of regulatory initiative or action. The Gas Act 1995 (passed into Law, March 1st, 1996) created three types of licence: the public gas transporter’s licence, the gas supplier’s licence and the gas shipper’s licence. However, while this legislation also prevented a person (legal entity) holding a public gas transporter’s licence from holding either a supplier’s or shipper’s licence, it did not prevent such a multiple of licenses from being held within a single corporate group. The Gas Act thus did not foresee ownership unbundling¹⁹.

Stemming from what said full ownership unbundling was not driven by the objective of optimising the use of the network but by purely commercial considerations: the rationale for this private decision to demerge was that BG saw two quite different markets emerging, which it felt would be best served by two separate companies²⁰.

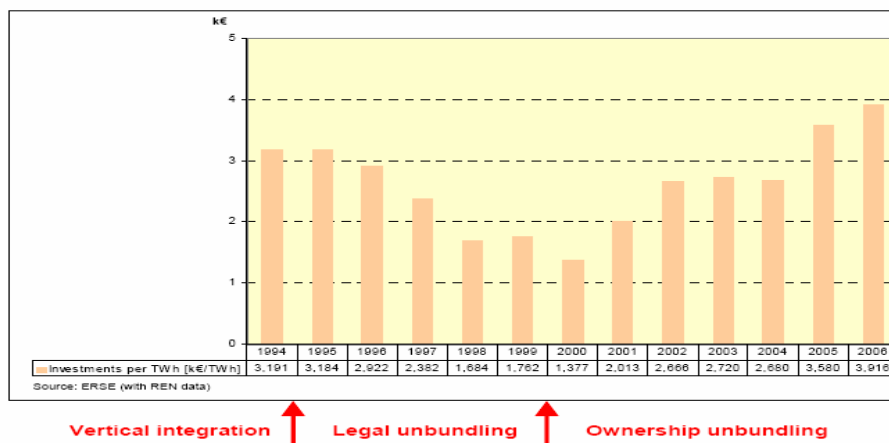


Figure 3: Investments in the Portuguese transmission network
Source: ERGEG, 2007

¹⁸ Issues Paper, DG Competition 15/11/2005, clause 28.

¹⁹ See SERIS 2006.

²⁰ This outlook was clearly expressed at the time by Cedric Brown, the Chief Executive of British Gas: “In the competitive gas market, our national pipeline and storage business, Transco, has its own type of customer. At the other end of the scale, British Gas Supply itself will soon compete with Transco’s other customers to supply gas to Britain’s domestic gas users. These are very different businesses and we believe that it makes sense for everyone – our staff, our customers and our shareholders – to separate them completely.” See, British Gas, Annual Report & Accounts 1995.

Let's add some elements to the regulatory framework: the Energy Regulator is represented by OFGEM that chose a revenue-cap regulation as for access tariff: National Grid is obliged to present its costs to OFGEM. The incurred costs are verified and, if necessary, reduced to efficient costs by the regulator. Investment levels are decided jointly by the network company and the Authority at the beginning of each regulatory lag. The governance of the grid is extremely peculiar insofar as security, quality, TPA regime and information spread are regulated in the Network Code, and the latter is constantly emended by an independent committee made up by all the interested subjects, that is to say shippers, network operator and the regulator itself. Besides, already when transportation had been internally unbundled within British Gas in 1996, enabling a separate transportation price control to be applied, this new system of governance was developed to ensure that Third Party Access was non discriminatory and operational according to specific rules agreed between the System Operator (internally-unbundled Transco), the users and the regulator. So, it can be affirmed that British Gas decided to sell the network at a profitable price, since regulation was effective in neutralising any possible benefit for the integrated company in holding the network.

As for tariffs, there is no available data about the average transportation costs incurred by shippers using the network. However, it is possible to calculate the average unit transportation revenue received by the network operator²¹. The first point to make is that it was regulatory action under the 1997-2002 Transportation Price Control, which determined suppliers' transportation costs during this period, not a change in the nature of Transco's ownership.

Such regulatory action could of course have been taken had Transco continued to remain unbundled within British Gas. Besides, from the figures above, it should be concluded that: in 1995-2000 (internal unbundling only) Transco's unit revenue fell considerably; in 2000-2004, for the first time, an actual increase in unit revenues/suppliers' costs was experienced reversing the trend of earlier years.

²¹ Logically, this must be equal to the average transportation cost paid by suppliers.

Years	Transco Revenue (Third Party only) £ million	Gas input to transmission system Million kWh	p/kWh	% change in unit revenue
1995	3000	778.874	0.385	
1996	3324	923.798	0.360	-6.50
1997	3071	928.871	0.331	-8.10
1998	3062	955.342	0.321	-3.00
1999	3058	1011.284	0.302	-5.90
2000	2975	1063.606	0.280	-7.30
Jan01- Mar02	3922	1359.874	0.288	2.90
Mar02- Mar03	3037	1036.157	0.293	1.70
Mar03- Mar04	3122	1043.906	0.299	2.00

Table 3: Evolution of transmission tariffs in the United Kingdom.
Source: SERIS, 2006

Adequate levels of investment in both increasing network capacity and in the timely replacement of degraded sections of the network may be considered one of the most important considerations in assessing the degree of optimal/sub-optimal network use. Both before and after the demerger there were complaints that British Gas and Transco were failing to make adequate investments in the system. The extent to which investment is ‘inadequate’ can be estimated by comparing the level of required investment agreed with the Regulator at the time of determining the next price-control with the out-turn investment made by the company over the same period. The network operator under-spend in relation to the price control ranged between 21% (previous to full unbundling) and 23 % of what previously agreed²² (after full unbundling).

In the end what is possible to conclude from the above evidence is that it can be excluded or at least be questioned whether changes in the ownership structure of the network company have positive effect on the utilisation of the grid.

7. ISO: a second best model?

As said before, concerns of those who are against ownership separation are represented (among others) by the fact that the integrated company loses part of its bargaining power with respect to other players and by the reduction in the credit rating due to the loss of low risk assets. That is why ERGEG (2007) proposes an alternative solution: an independent system operator (ISO). The ISO model separates the ownership of assets, which stay with the vertically integrated company, from operational tasks of the former network company which are attributed to a new independent operator.

²² SERIS 2006.

ISO models are therefore in between legal unbundling and ownership separation. Of course, it is possible to have a multiplicity of ISO models, depending on the tasks assigned and the geographic extent. As for its competences they can vary from:

- Deep ISO, where all the functions of the system operator are removed from the bundled company, who is left only with the ownership of the assets;
- Shallow ISO, where all transmission functions (including investments decisions) remain with the bundled company apart from the live operation of the transmission network during and close to real time.

As for its geographic extent, we can have:

- One ISO per TSO, where there is an independent operator for every network;
- National ISO, where there is an independent operator who is responsible for all the networks on the national territory, even though they belong to multiple companies;
- Regional ISO, where a supranational system operator coordinates more than one national network, thus optimizing their utilization.

Again, the rationale for an ISO model is to reduce the scope for discrimination. More, the creation of a regional ISO would also mean a further step toward market integration and, consequently, a deeper harmonization of each State regulation which is the key to market liberalisation. At the same time, the ISO model would help to solve some political arguments which contrast ownership separation such as the risk for the network to be acquired by non-reliable subjects (non-European producers?). But the ISO model is no panacea either. According to the necessity to reduce the scope for discrimination, the ISO should at least be in charge of those activities that entail the highest risk of discrimination, such as capacity allocation mechanisms (non price regulation), physical market management (congestion management, balancing, ancillary services, market scheduling, etc.), investment planning, relevant information disclosure (available capacity) and maintenance activity planning. There are several problems that this activity allocation would inevitably bring. Let's define them:

- Conflict of interests: the vertically integrated transmission operator can be conceived as the interests-bearer of a vertically integrated company; these interests could contrast with the investments dynamics decided by the ISO insofar as it is the TO that should pay for them. The ISO model would lead to a conflict of interests regarding the incentives to manage and develop the network (who does that? Who pays for it? How will the benefits be shared?) and would make the implementation of incentive regulation harder (if the ISO is not efficient the TO could not cover its costs). At the same time this would create problems concerning any legal liability (who is responsible for any lack of investment, or for any incident?) and would make it necessary to draw up agreements between the two entities generating non negligible transaction costs;
- The ISO model generates a raise in the number of actors to be regulated insofar as it calls for a continuous interaction among the regulatory Authority, the independent operator and

the owner, thus augmenting regulatory costs (any authority should control the ISO, the owner, their agreements, coordinate them in every activity and solve litigations between them);

From this brief review, it is possible to see that the ISO model would broaden the scope for any regulatory authority, thus complicating its task. On the other hand, it would leave the ownership of such network in the hand of the incumbent, avoiding the risk of downgrading its rating, while reducing the scope for access discrimination.

It would be necessary to make a reliable balance of the above mentioned issues, in order to appreciate (or not) the adoption of an ISO model (and to properly design its liabilities). It would be in other words necessary to assess the benefits of increased competition on the network (given that this occurs) together with the benefits relating to the invariance in the credit rating of the vertically integrated company vs. the augmented regulatory costs. This represents yet a very difficult task.

8. Conclusions

The EU laments a lack of competition in the gas market and blames vertical foreclosures to be responsible for it. In particular, the Energy Sector Inquiry indicates the property of the network as the major problem. In fact, it states that competition cannot increase without the ownership separation of the system operator from the vertical integrated incumbent. The Inquiry calls for a new Directive, since it states that legal unbundling is not enough to discourage discriminatory behaviour.

The argument represented by the possibility that vertical integration of the network could lead to opportunistic and discriminatory behaviour in disfavour of new entrants is undoubtedly very attractive but:

- There are theoretical arguments both in favour and against vertical disintegration. The tests suggested in the article call for a case by case analysis, since there is not an uncontroversial solution. Furthermore, theory does not consider all the costs associated to disintegration and it does not take into account the first segment of the gas industry, namely production. This can bring misleading results, since it can be argued that barriers to competition come from this segment in the first place. The reasons of this are clear: production is held by an extra UE oligopoly, which captures the most relevant part of the value chain. Theory does not help when it comes to answer this question. Moreover, it remembers that, no matter the property structure, the essential facility has to be fully regulated in order to avoid any discrimination;
- The EU legislation, in spite of the fact that its orientations clearly develop in this direction, has not opted for ownership unbundling yet;
- No Member State but UK has really implemented this measure so far;
- Analysing all the pros and cons of ownership separation, it is evident that arguments in favour are as much numerous as arguments in disfavour of ownership unbundling. Moreover, every issue (be it positive or negative) can be easily contrasted. This means that there are no

uncontroversial arguments in favour (nor in disfavour) of OS, making it difficult to get a stand on this point, even under an empirical point of view. Moreover, it is possible to claim that effective regulation managed by an empowered authority can be enough to solve any possible vertical foreclosure. As demonstrated by the British case, regulation can eliminate incentives to discriminate, thus leaving the incumbent indifferent form owning or not the network;

- Also the case study has emphasised how it is not possible to conclude that separation of the network operator generates benefits in terms of optimisation of the network utilisation, even though a more in-depth analysis would be necessary to evaluate the effects of such a measure.

Besides:

- The main point in analysing the lack of competition on the European gas market is definitely represented by the natural gas market structure: the latter is in fact characterised by the absence of plurality on the supply side (competition among non-European producers);
- There are other reasons for market foreclosure that receive less attention. It is the case of long term take or pay contracts (another type of vertical integration) that cause networks and final markets pre-emption as well as restrictions in the access to international grids (transit pipelines).

All this issues should be carefully analysed, evaluating the possibility of implementing tools capable of increasing competition among producers (and not among importers), since producers capture the most part of the scarcity rent.

In other words, the success in opening the networks to third parties depends upon the existence of third parties and the latter cannot exist if they are not granted access to new natural gas (CEER 2006).

It is obvious that there is an ample scope for further research. From a theoretical point of view, it would be essential to analyze the industry as a three-segment one, in order to better assess the role of production. Furthermore, it would be useful to concentrate on the costs associated to the disintegration of an integrated company. Empirical studies should instead try to assess the impact of production on the final price and should evaluate the real bargaining power of producers and the concrete way to reduce it.

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