

No. 12-14

2012

REGULATORY REFORM AND CORPORATE CONTROL IN EUROPEAN ENERGY INDUSTRIES

*John Jairo García
Francesc Trillas*

Documentos de trabajo

Economía y Finanzas

Centro de Investigaciones Económicas y Financieras (CIEF)



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Regulatory Reform and Corporate Control in European Energy Industries

John J. García, EAFIT, and Francesc Trillas, UAB

Abstract-- The deregulation process in the EU electricity sector triggered strategic decisions that led to industry restructuring. This paper presents preliminary evidence of the impact of this process on investors, using event studies and estimation techniques such as least squares and GARCH. Our findings suggest three stylized facts: 1) regulatory reform in Europe was certainly accompanied by a takeover wave, as predicted by Mitchell and Mulherin (1996); 2) mergers and acquisitions had a positive impact on the stock price of target firms, and a much lower and sometimes even a negative impact for the bidding firms; 3) the effect of takeover announcements on the returns of competitors of the merging firms depends on the degree of market power. In countries with high market power (like Spain) competitors significantly increase share returns upon takeover announcements, whereas in countries with lower market power (like England and Wales) returns do not change significantly.

Index Terms- Companies, Electricity supply industry deregulation, Oligopoly, Stock Market.

I. INTRODUCTION

This paper presents a preliminary investigation of the impact of regulatory reform in the European energy markets on the market for corporate control. Mitchell and Mulherin (1996) found that factors such as changes in regulatory governmental policies had an important effect on the takeover wave in the financial, transport, and energy sectors of the USA in the 1980s and 1990s. Similarly, as we document below, energy firms undertook actions in the market for corporate control to adapt to the regulatory changes (liberalization, deregulation, regulatory reform, privatization) that took place in Europe starting in the last decades of the twentieth century. More specifically, these changes have triggered an unprecedented wave of mergers and acquisitions, many of them through takeovers. However, there is very little work on the relationship between regulatory changes and corporate control activity. In particular, an exercise that has

become standard for other industries (to compute through event studies the impact of corporate changes on shareholder value and extract economic implications from it) has not been extensively applied to European energy firms (see Trillas, 2001, for a very limited exception). This paper is a first attempt to fill this gap.

We provide information on the coincidence in time of regulatory reform and very significant changes in corporate ownership, and we quantify the impact of some corporate control events on transacting companies' stock returns through a range of estimation techniques, such as least squares, GARCH and SURE. We obtain three important results: 1) The European energy sectors have experienced a wave of mergers and acquisitions, which has been contemporaneous to the regulatory reform process. 2) There are statistically significant positive abnormal returns for target firms and weakly significant negative returns for the bidding firms; and 3) Takeovers have a positive effect on the value of competitors in a market characterized by high market power (Spain), and non-significantly different from zero effect on the value of competitors in a market characterized by low market power (England and Wales).

Significant changes in public policies or technology, supply and demand shocks, trigger changes in industry structure. European energy firms are a case in point; they do not stay as spectators of regulatory reform, but try to position themselves to face the new challenges. These actions take place in many instances through the market for corporate control. Event studies quantify the impact of these actions on shareholder value, and this may provide a test for a variety of economic hypotheses. The methodology is based on measuring the reaction of shareholders' expectations in front of new information and, therefore, the expected effect on the firm's discounted value (see Fama et al., 1969; Binder, 1998; Campbell et al., 1997; and Khotari and Warner, 2006). A merger for example may create value for shareholders, through efficiencies caused by scale or scope economies, vertical integration, or through increased market power. This paper uses OLS and GARCH estimation techniques to analyze the impact of changes in the corporate control of the main European energy firms on their value, as measured through stock prices. Specifically, we first analyze target behavior through the impact of takeovers launched on Endesa, Hidrocarbónico, Scottish Power and Unión Fenosa. Next we look at the effect of takeovers on the returns of competing

We acknowledge financial support from the Spanish Government under projects ECO2010-20718 and ECO2009-06946

John J. García is with Universidad EAFIT, Colombia. AA 3300 Medellín (Colombia). Phone: (+574)2619549, Fax: (+574)2664284 (e-mail: jgarcia@eafit.edu.co).

Francesc Trillas is with Universitat Autònoma de Barcelona – Campus de la UAB, 08193 Bellaterra (Cerdanyola del Vallès) Barcelona – Spain (e-mail: francesc.trillas@uab.es)

firms.¹ And finally, we quantify the impact of mergers and acquisitions for eleven of the most important energy firms in Europe: E.ON, RWE, Endesa, Gas Natural, Iberdrola, Unión Fenosa, ENEL, ENI, Energías de Portugal, Suez and Vattenfall.

After this introduction, we present some hypotheses and explain the methodology and data that will be used to test them. Finally, we show the quantitative results in terms of the impact of corporate changes on the value of firms, and finally we conclude.

II. HYPOTHESES, METHODOLOGY AND DATA

A. Hypotheses

Any expansion of firms raises questions about its impact on shareholder wealth. Event studies provide evidence of such impact, by measuring the abnormal returns associated to unanticipated events. To the extent that financial markets are efficient, event studies provide evidence on the impact of the announcements on the firm's stream of profits and, therefore, its discounted value. A merger can create value for shareholders if there are efficiency synergies (scope or scale economies, vertical integration) or if the merger increases market power.² This usually translates into positive abnormal returns for target firms' shareholders, while stock prices of bidding firms may not significantly change. The literature explains this as a free-rider problem: shareholders only sell their shares if the bidding price equals the expected price of the shares after the takeover. Then any improvement in the value of the firm triggered by the change in management is captured by the shareholders of the target firm. It could also happen that value is destroyed as a result of the merger, if the bidding firm overpays for the target. This may be a signal that mergers are carried out for reasons that are unrelated to shareholder wealth. For example, the optimal size of the firm for managers may be larger than the optimal size from the point of view of the value of the firm (empire building). We are interested in looking at empirical evidence through the lens of two hypotheses:

Hypothesis 1:

The value of target firms in the energy sector increases when a takeover is announced.

Hypothesis 2:

The effect of the announcement of a takeover on the value of competitors depends on the existence of market power. If market power is high, competing firms experience statistically significant positive abnormal returns.

A merger becomes an opportunity for the buying firm given the possibility of value creation, despite the costs of the

transaction. Value creation may result from exogenous changes in supply or demand that increase the profit maximizing firm size. Synergies may include more efficient management, or a better matching between management and physical assets. They may also include vertical efficiencies (through the elimination of double marginalization, through the internalization of externalities or through better incentives for sunk investments), or the combination of complementary resources. Finally, a higher value of the firm may be due to increased unilateral or multilateral market power that derives from a lower number of firms (Eckbo, 1983).

It could be that improvements in social efficiency derived from a merger can be sufficiently high to compensate for the loss of welfare from collusion, if this exists. But if a merger increases the chances of collusion, it should be welcomed by shareholders of competing firms. The effect of a takeover or a merger announcement on non-merging competitors, however, is a topic that has been less explored from an empirical point of view. Eckbo (1983) argues that the sign of the expected effect on rivals is unclear. Abnormal returns could be positive, because the number of firms in the industry diminishes, and this increases unilateral (for example, in a Cournot model) and multilateral market power (in more general repeated oligopoly models), which also benefits the rivals of merging firms. But abnormal returns for rivals could also be negative, if they anticipate that the merging firms will be more efficient and therefore more competitive, hindering the profitability of their rivals. Consistent with the first possibility, Duso et al. (2006) find, for a sample of mergers and acquisitions that were analyzed by the European Commission, statistically significant positive abnormal returns for the competitors of the merging firms.

B. Methodology

Event study techniques have been used to evaluate corporate events and the effect of regulatory changes in different industries. Hypotheses that make some prediction for firms' profits can be tested with these widely and increasingly used techniques. A crucial assumption of event studies is that all publicly available information is incorporated in stock prices, that is, the semi-strong version of the efficient market hypothesis holds. This is not the place to discuss this hypothesis, but it is a salutary caveat to remark that many of the economic implications of event studies hold to the extent that this hypothesis is valid.

The most widespread model used to predict normal returns of firm j in period t is the market model. Then real returns are compared to these normal returns to obtain a measure of abnormal returns (Campbell et al., 1997, and Fama et al., 1969).

$$R_{j,t} = \alpha_j + \beta_j R_{m,t} + \varepsilon_{j,t} \quad (1)$$

with $E(\varepsilon_{j,t}) = 0$ and $Var(\varepsilon_{j,t}) = \sigma^2_{\varepsilon_j}$

¹ For example, for the three takeovers that had Endesa as target, we analyze their effect on the returns of Iberdrola and Unión Fenosa, which are Endesa's competitors in the Spanish electricity market.

² Cox and Portes (1998).

where R_{jt} are the returns of firm j in period t , R_{mt} are the returns of a portfolio of firms representing the stock market (we use Eurofirst 300), α_j and β_j are parameters and ε_{jt} is an error term. To this model, one can add a dummy variable:

$$R_{j,t} = \alpha_j + \beta_j R_{m,t} + \gamma_j D_{j,t} + \varepsilon_{j,t} \quad (2)$$

Where γ_j captures the abnormal return of action j in the date of event t , directly estimated in the regression. One can group sets of actions to compute average abnormal returns, for examples for takeover events of a same firm or group of firms. With several firms, it would be possible to obtain extra information by using a system of equations (Binder, 1985):

$$\begin{aligned} R_{1,t} &= \alpha_1 + \beta_1 R_{m,t} + \sum_{a=1}^A \gamma_{1a} F_{1,t} + \nu_1 \\ R_{2,t} &= \alpha_2 + \beta_2 R_{m,t} + \sum_{a=2}^A \gamma_{2a} F_{2,t} + \nu_2 \\ &\dots \\ R_{n,t} &= \alpha_n + \beta_n R_{m,t} + \sum_{a=n}^A \gamma_{na} F_{n,t} + \nu_n \end{aligned} \quad (3)$$

where $\nu_1 \dots \nu_n$ are the error terms for the n firms. These terms can be heteroskedastic across firms, but not correlated over time. It is also possible to introduce restrictions over coefficients, such as equality of betas, which can be tested through maximum likelihood or Wald tests.

As argued by Savickas (2003), an appropriate approach used to estimate the volatility of the conditional process of the variance, can be represented as follows:

$$\begin{aligned} R_{j,t} &= \alpha_j + \beta_j R_{m,t} + \gamma_j D_{j,t} + \eta_{j,t} \\ \eta_{j,t} &\approx N(0, h_{j,t}) \\ h_{j,t} &= a_j + b_j h_{j,t-1} + c_j \eta_{j,t-1}^2 + d_j D_{j,t} \end{aligned} \quad (4)$$

where $h_{j,t}$ is the conditional variance of the time variation and a_j, b_j, c_j, d_j are the coefficients of the GARCH (1,1) specification; $D_{j,t}$ dummy variable equal to 1 for the date of the event for firm j and 0 otherwise. γ_j captures the coefficient of the abnormal returns on the date of the announcement. The conditional variance $h_{j,t}$ provides a natural estimator of the variance of the abnormal returns.

The GARCH approach explicitly models the volatility of the returns and the possible increase of the variance that takes place when there are unforeseen events. In the estimation through a traditional approach such as OLS, there is a higher probability of rejecting the null hypothesis when this is not false (Savickas, 2003).

C. Data

The events concerning takeovers, mergers and acquisitions for each of the firms were selected from the data bases LEXIS-NEXIS and OSIRIS. The criterion that was used for their selection was that they had the characteristic of a ‘‘surprise’’ event, that is, not anticipated by the market.

The historical series of daily stocks and indices was obtained from Yahoo Finance³ and in some cases directly through the firms (as in the case of the historical series of Hidrocarburo stock prices; Hidrocarburo ceased to be traded as an independent stock when it was acquired by Electricidade de Portugal). The European indices used in the estimations is Eurofirst 300.

Daily returns are computed using a logarithmic transformation:

$$R_t = \ln(P_t) - \ln(p_{t-1}) \quad (7)$$

where $R_t = \ln(r_{t+1})$ exhibits results that are practically identical to a growth rate, with a distribution that is more symmetric and that is more convenient for the transformation of the series.

III. IMPACT OF CORPORATE CHANGE ON THE VALUE OF THE MAIN EUROPEAN ENERGY FIRMS

A. The Market for Corporate Control in the Energy Sector

Europe has seen an unprecedented crossborder mergers and acquisitions wave in the energy sectors at the beginning of the XXI century. This seems to have been in preparation or as a reaction to regulatory reform in the industry. If companies cannot influence market rules, they may try to influence industry structure. We present in this subsection some case studies that show how takeovers in energy sectors are protracted and how the setting is such that the shareholders of the target firms stand to gain much more than the shareholders of bidding firms.

The Endesa Takeover Battle

In September 2005 the Spanish firm Gas Natural made an offer for Endesa that triggered a bitter economic and political debate, because a company based in Barcelona (the second largest city in the country) was trying to take over a company based in the capital Madrid. The management team of Endesa defended its position using political and economic strategies. In 2006, an offer by E.On improved upon the one by Gas Natural, although it was also initially rejected by the

³ <http://finance.yahoo.com>

management team, and triggered a reaction by the Spanish government trying to stop a surprise acquisition of control by foreign interests. This reaction included a discretionary change in the rules of the electricity regulatory agency that allowed this agency to stop a merger appealing to reasons of security of supply or national interest. In 2007, the battle finished with an Italian company, ENEL, which had the Italian state as the main shareholder, gaining control of the company in partnership with a Spanish construction firm, apparently with the agreement of the Spanish government.

Spanish electricity firms (and especially Endesa) had been among the protagonists of a remarkable expansion process characterized by investments in Latin America, investments or alliances in the rest of Europe, and diversification in the telecommunications and other industries. The largest in magnitude have been the acquisitions in Latin America.

The expansion of Endesa in Latin America, like that of Telefónica, the Spanish incumbent telecommunications operator, started and gathered momentum when the largest shareholder of the company was the state, prior to the full privatization of the firm. The global result of the expansion in Latin America was neutral for Endesa's shareholders, according to the *event study* technique, although the impact of the largest acquisition, the takeover of Chilean firm Enersis, was negative according to two studies mentioned below. Endesa also expanded in telecommunications (Retevisión, Amena, Menta, later integrated under the company name Auna), although it has recently abandoned this industry after the sale of Auna to Ono and France Telecom.⁴ Both in Telefónica and in Endesa there are reasons to believe that the main corporate control mechanisms did not work appropriately. There were no shareholders with a controlling stake, there was no credible takeover threat at the time (either because of public ownership at the early stages of the expansions, or because of the government's threat to use the golden share), and product market and managerial labor market competition were scarce. The only factors that provided external discipline to managers were the fact that the companies' stock was quoted in international markets and the presence of institutional shareholders, as well as the slow and progressive introduction of product market competition (especially in mobile telephony in telecommunications and in the generation segment in electricity). The takeover of Enersis, the largest privatized electricity firm in Chile, in the late 1990s, took longer and was more costly than expected, and with a negative effect on (both bidder and target) shareholder wealth. It is not clear either that Chilean consumers were better off with the takeover. On the one hand,

the takeover put pressure on the Chilean regulator to improve competition conditions in electricity, by triggering a debate on vertical integration. But Endesa won the takeover battle by defeating an offer by the American firm Duke Energy, which was less willing to pay the high cost of a protracted and politicized battle, but it may well have had a better business plan for consumers.

Precise quantitative evidence on the effects of Spanish firms' expansion comes from event studies, which provide a measurement of the impact of particular events on shareholders' expectations (and, therefore, to the extent that financial markets are efficient, a quantification of the expected effect on the firm's discounted value). Trillas (2001) concentrates on the Endesa case, with especial attention on the Enersis takeover. This study reveals a negative and significant impact on their own shareholders and on the minority shareholders of the target firm in the largest acquisition of Endesa in Latin America. However, existing event studies, either they present a too general picture, or a too narrow one, without presenting as yet a quantification of the effect on shareholders of all corporate control transactions in the overall electricity industry. The fact that the largest firms have been acquirers makes it likely that the global result will most probably not be a net gain for shareholders (given that the bidder shareholders usually obtain worse results than target shareholders), but the exact quantitative exercise remains to be done, and will probably and reasonably have to wait until the takeover wave ends. The increasing takeover threat on these large firms can more recently be a discipline mechanism for managers, who possibly will be in a learning process on how to better measure investment risks.

After the Gas Natural takeover, E.On showed interest in Endesa. E.On is the result of the merger of two large electricity firms in Germany in the late 90s, Veba and Viag. The resulting firm very soon engaged in a number of international acquisitions, such as Sydkraft in Sweden and Powergen in the United Kingdom, and merged with the dominant German gas operator, Ruhrgas. In early 2006, E.On announced its last big acquisition, a takeover over Spanish Endesa, competing with a previous takeover launched by the Spanish gas firm Gas Natural. E.On thus followed the pattern of first creating a strong national firm and next expanding internationally.

The Powergen and Endesa acquisitions were presented both as friendly or "white knight" acquisitions. Powergen and Endesa also have in common that they were both the result of privatization and had been diversifying in other industries and geographically -Powergen in the US and Endesa in Latin America.

The example of E.On is often shown to illustrate a trend towards vertically integrated global utilities focused both on gas and electricity, but abandoning investments in other industries such as telecommunications. The only significant effect of the main E.On acquisition announcements in the recent past is a positive abnormal return at the time of the Ruhrgas merger announcement. The announcement of the

⁴ Unión Fenosa is also a Spanish electricity firm with significant investments outside the energy sectors, for example in the Airports sector in Mexico, or in the engineering sector with subsidiary Soluziona. Although diversification outside the energy sectors have been punished by investors, the participation of the same firm both in electricity and gas markets is broadly accepted as a value-creating development, due to productive efficiency gains obtained through mainly vertical integration in the provision of gas as an input in electricity generation, and also to joint offers in the retail supply of gas and electricity.

acquisitions of Powergen and Endesa did not have a significantly different from zero effect on shareholder value, although the sign of the abnormal return in the Endesa case is positive. This is consistent with the theoretical and empirical research on takeovers, which expects that shareholder gains are captured by the target firm shareholders. In contrast with the acquisition of Enersis by Endesa, however, at least the acquiring shareholders do not expect to lose from these acquisitions. Since 2000 the stock market behavior of E.ON had been much better than that of Endesa. One may thus conclude, first, that expanding firms can show very different performance in the stock market depending on the details of expansion, and that firms with expanding strategies that are not welcomed by shareholders (bad bidders), risk being taken over by even stronger rivals (that is, they risk becoming good targets).

Since E.ON stepped in at the end of February 2006 with a bigger and better offer than that of Gas Natural, the government manoeuvred to frustrate it. E.ON was offering €29.1 billion (\$34.7 billion) for Endesa—the biggest takeover bid in the history of the utilities industry—compared with Gas Natural's €2.5 billion cash-and-stock offer. After its own antitrust authority and the EU approved E.ON's proposal in April, the government's obstructionism intensified. Eager to thwart the deal, the government invested special powers in CNE, which is Spain's energy regulator and is controlled by a board that is close to the government. At the end of July 2006 the CNE imposed 19 conditions on E.ON's bid for Endesa, such as a commitment to invest in gas-transmission networks and an obligation to keep Endesa properly capitalised. Three of the CNE's demands were very controversial. First, E.ON would have to sell the only nuclear-power plant wholly owned by Endesa. Next, it would also have to sell all of Endesa's coal-powered plants, because Spanish coal is subsidised and the government is worried that the Germans would use cheaper imports. Third, Endesa's operations on the Balearic and Canary Islands, and in northern Africa, must be divested.

The corporate control of Endesa was quite contested: four firms were involved in the competition for the prize, two Spanish firms (one from the gas sector, Gas Natural; and another from the construction sector, Acciona); a German one, E.ON; and an Italian one, Enel. After a takeover battle of more than two years, the end seemed to be near when on 1st October 2007 ENEL and Acciona announced that they were in possession of 92.06% of the shares. However, it was not until February 2009 that ENEL obtained full ownership of Endesa, after a series of discrepancies with Acciona. The control battle that had started on September 5th 2005 finished almost two and a half years later.

On July 4th 2007, the Spanish energy regulatory agency CNE approved, under twelve conditions, the takeover launched by ENEL and Acciona. The next day, the takeover was also approved by the European Commission. Between August 2005 (one month prior to the first takeover by Gas Natural) until October 2007 (when ENEL and Acciona effectively acquired 92.06% of Endesa), the value of the

shares of Endesa increased in 119%⁵.

Using the GARCH methodology suggested by Savickas (2003), the average abnormal returns for Endesa shareholders of events related to the takeover battle were 4.16%. The OLS results are 2.72%. This is consistent with our hypothesis that target firm shareholders are winners in takeover battles.

The Hidrocarbónico Takeover Battle

In 2000, EnBW, a German subsidiary of the state owned French firm EDF, announced a takeover of Hidrocarbónico, the fourth largest electricity firm in Spain, which has most of its assets in the northern region of Asturias. The Spanish government reacted passing a law forbidding any foreign state-owned firm from controlling an electricity company. This law would be subsequently rejected by the European institutions. The Asturias regional government was more open to bargaining, and since the beginning showed a predisposition to lobby for the takeover in exchange for industrial and employment concessions. The takeover battle triggered by the initial EDF offer ended four years later, in 2004, when the state-owned Electricidade de Portugal (EDP), in partnership with a regional savings bank, Cajastur, made a final winning offer that was accepted by the shareholders of Hidrocarbónico, committing the firm to keep its headquarters in Asturias and develop a number of industrial development and employment programs.

The case of the ownership and control change in Hidrocarbónico illustrates some of the more interesting aspects in the corporate control market in Spain, namely the role of the different levels of government (European, Spanish, regional), the saving banks, the state owned firms and target firm managers. Hidrocarbónico unsuccessfully opted to buy Viesgo when Endesa put it up for sale. Besides, the takeovers of Unión Fenosa and Ferroatlántica-EnBW implied the withdrawal of other takeovers that had been launched, respectively, by the US firm Texas Utilities and the German firm RWE. Furthermore, the Spanish government lifted the veto on the political rights of foreign state owned firms in Hidrocarbónico in September 2003 after receiving a warning from the European Commission.

Hidrocarbónico was the target of five takeovers in 2000 and 2001, those launched by Texas Utilities, Unión FENOSA, Ferroatlántica-EnBW, RWE and Cajastur-EDP. That is, one US firm, two German firms (one of them with the state owned French firm EDF as the main shareholder), one Portuguese firm and one Spanish firm. The Belgian firm Electrabel also participated in the takeover contest as a minority shareholder. The winning takeover was that of Ferroatlántica-EnBW, although Cajastur and EDP stayed as minority shareholders. Eventually, EDP acquired, in a direct transaction in 2004, a share package from the rest of shareholders to reach 95% of

⁵ Between October 2003 and October 2005 there were 20 takeovers in Spain with an average premium for minority shareholders of target firms of 20.3% over the share prices the day before the takeover was announced.

the stock, in such a way that Hidrocarbónico became a subsidiary of EDP, with a Chairman proposed by the minority local shareholder, saving bank Cajastur. The successful foreign companies, first EnBW and next EDP, participated in the contest in alliance with local investors, with the goal of overcoming political resistance associated to the loss of control by national shareholders.

The control contest for Hidrocarbónico, the fourth largest Spanish electricity firm, lasted more than one year between 2000 and 2001, and it did not end in practice until 2004 with the assumption of total control by EDP.

One of the interesting issues in this takeover battle was that the regional government from Asturias (one of the Spanish Autonomous Communities in the North of Spain, where the company headquarters and most of its assets are located) and the then incumbent management team called for the takeover battle to take place, setting as condition that the firm kept its headquarters in Asturias and that the ownership change was compatible with maintaining industrial and employment objectives in the region. The Asturias regional government went to the extreme of criticizing the Spanish government over the takeover battle, because the Spanish central government was against the presence of firms controlled by foreign state-owned capital, while the Asturias government was willing to accept such presence if it made possible to have a strong subsidiary with its headquarters in Asturias, and willing to cooperate in industrial and employment objectives. This illustrates that not all governments support national or regional champions in the same way. With the outcome of the battle, economic and social agents in Asturias managed to make compatible strong gains for shareholders; the entry of a strong firm with the ambition to be a key player in the forthcoming (although several times postponed) Iberian Electricity Market together with the largest Spanish electricity firms, implying consumer gains from product market competition and improved productive efficiency; and the guarantee that the new owners would cooperate with "strategic" objectives of industrial and employment policy, as interpreted by the Asturias regional government.

Between the starting point of the takeover battle and the approval of the final bid by the European Commission in March 2002, the share prices of Hidrocarbónico increased by 120%.

Using the GARCH methodology, the average abnormal returns for Hidrocarbónico shareholders of events related to the takeover battle were 3.1%. The OLS results are 1.7%. This is again consistent with our hypothesis that target firm shareholders are winners in takeover battles.

Merger between Iberdrola and Scottish Power

The process of the acquisition of Scottish Power by Iberdrola only lasted five months. Iberdrola announced its interest in the Scottish firm on November 8th, 2006, and the courts in Edinburgh resolved the last barriers for the integration of both firms on 23 de April, 23d, 2007. A plausible explanation of this is that market power in the

British energy market is not high. This is one of the few energy markets in Europe where concentration levels are relatively low.⁶ This was ratified by the European Commission when it approved the transaction without conditions on February 15th, 2007. On March 2nd of the same year, the parties obtained the last regulatory approval by the Public Utilities Commission of the State of New York in the US, which was needed given that both merging firms had assets in the American market.

The surprise announcement of the acquisition on November 8th 2006 was associated to a 3% abnormal return, computed both with the GARCH and OLS methodologies. If we compute the impact on shareholders between one month before the takeover, October 2006, and April 2007, when the acquisition is finally authorized, the share price increased in 20%.

Compared with the much higher increase of the value of Endesa and Hidrocarbónico during their takeover battles, in this case the value increase is substantially lower. One possible explanation is that these Spanish firms operated in a context of higher market power, with larger rents to be captured from reducing the number of firms. Campa and Hernando (2004) find that the announcements of mergers and acquisitions for firms in industries that had previously been under strong regulatory controls, obtain comparatively lower abnormal returns than when regulatory controls are less strict.

Merger between Gas Natural and Unión Fenosa

After the failed attempt to take over Endesa in 2005, Gas Natural acquired Unión Fenosa in 2009. The day that the acquisition was announced, the shares of the acquired firm experienced abnormal returns, -4.1% with the GARCH model and -4% with OLS. The Credit Rating Agency Fitch stated that there were likely negative implications of the debt increase in Gas Natural as a result of the operation (Reuters 31-07-2008). The transaction took place in two stages. In the first, the gas company, after the approval by the Spanish regulatory agency CNE, bought 9.99% of the shares on August 17th, 2008, and on February 26th, 2009, it bought the remaining 35.32%. With this purchase, it obtained 50.02% of the shares in the company, since it had a minority stake prior to the first stage. The second stage required launching a takeover for the rest of the shares, in a process that concluded on April 2009, after the stock exchange regulator, CNMV, authorized the takeover on March 18th, 2009. The share price of the acquired firms, between the announcement of the acquisition until the final authorization by the CNMV, increased in 42% (see Graph 4).

The facts in corporate control market for Spanish electricity firms in the last decade are consistent with some of the predictions derived from academic research:

-Liberalization has triggered a mergers and acquisitions

⁶ For example the HHI for the UK after 1999 has been below 1000 points (Mattes et al., 2005). The thresholds established by the US and the EU define a market as highly concentrated at 1800 and 2000 respectively. A market with a HHI below 1000 is defined as non-concentrated.

wave, to the extent of involving all the firms in the industry, and has caused an increase in shareholder concentration.

-Takeovers in an industry where regulation still play an important role are protracted, not always successful and have a (sometimes too) high cost for shareholders in acquiring firms.

-Politicization of the control market in this industry shows in the background of some managers and in the reasons by which some takeovers find obstacles or are the object of heated debates with little economic or financial content. The activism of a variety of interest groups (such as managers, shareholders, local and regional communities) confirms that collusion between policy makers and *lobbies* is an important fact in this kind of industries, and that the conduct of regulatory institutions is seriously affected by its presence.

-Resistance to ownership changes reveals the importance that society, as mediated by its political agents, allocates to the control of firms. The specificity and long lived nature of investments still attract, in spite of liberalization, owners that are different from the profile of other capitalist private owners, especially state-owned firms and saving banks (which in Spain have a nature close to that of non profit mutual firms). Liberalization (wich only happens in some segments of the value chain) does not fundamentally alter the fact that long lived specific investments are still subject to a high regulatory, technology and market risk. The Spanish government stopped mergers between Spanish energy firms (Fenosa-Hidrocantábrico, Hidrocantábrico-Viesgo, Endesa-Iberdrola) consistently with the goal of not increasing national levels of industry structure concentration after the expansion of Endesa prior to its full privatization in the late 90s, but did not take advantage of the takeovers (for example through the imposition of conditions) or of the privatization of Endesa to achieve a less concentrated industry structure.

Effects of the takeovers on competitors' returns

We also studied the effect that the Endesa and Hidrocantábrico takeover announcements had on their closest competitors in the Spanish electricity pool. In all cases, competitors experience statistically significant positive abnormal returns. For example, on occasion of the Endesa takeovers, competitors Iberdrola and Unión Fenosa experienced abnormal returns of 2.1% and 1%, respectively (both with GARCH and OLS). On occasion of the Hidrocantábrico takeovers, competitors Endesa, Iberdrola and Unión Fenosa experience on average abnormal returns of 1.7%, 1.4% and 0.9%, using GARCH, and 1.2%, 1.5% and 0.4%, using OLS. Unión Fenosa's abnormal returns when the Hidrocantábrico takeovers are announced are not statistically significant, but this was at the time a small competitor. Overall, the results suggest that increased concentration derives into higher market power for all the firms in the market, along the lines of Eckbo (1983) and Aktas et al. (2006).

On occasion of the takeover of Scottish Power by Iberdrola, in contrast, British competitors Centrica and

National Power experience non-significant positive abnormal returns of 0.9% and 0.4%, respectively, both with models GARCH and OLS. A possible explanation is that the British market was characterized by a lower level of market power than the Spanish electricity market. Whereas the *Herfindahl-Hirschman* (HHI) index in the early years of the XXI Century was below 1000 in the UK, it was between 1500 and 1800 in Spain (Matthes et al., 2005). As explained by Duso et al. (2006) a positive reaction by competitors could be explained by the takeovers revealing information about potential efficiency gains in the industry as a whole. However, the fact that competitors react differently in markets with different degrees of concentration, suggests that market power is a more plausible explanation.

B. Mergers and Acquisitions of European Energy Firms between 2000 and 2007

In this sub-section, we analyze the impact of 40 events⁷ related to mergers and acquisitions by 11 of the most important energy firms in Europe. The abnormal returns of these firms' shares for these events are computed using OLS and GARCH. These 11 firms are: two German (RWE and E.ON), two Italian (ENI and ENEL), one French (Suez), four Spanish (Endesa, Gas Natural, Iberdrola and Unión Fenosa), one Swedish (Vattenfall) and one Portuguese (EDP). These firms were quoted in the stock markets between 2001 and 2007. We collected surprise mergers and acquisitions events for these companies using databases LEXIS-NEXIS and OSIRIS, between July 10th 2001 and May 31st, 2007.

GARCH and OLS individual regressions for each firm show two results.⁸

The firms that were mostly involved in selling transactions (Endesa and Iberdrola) experience statistically significant positive abnormal returns at the 1% level with both methods. For Endesa these returns are 3.7% using GARCH and 2.7% using OLS; while for Iberdrola they are 1.5% and 1.2% respectively.

The firms that were mostly involved in buying transactions mostly experience statistically significant negative abnormal returns. Only three of them experienced the opposite sign: Suez and EDP both with GARCH and OLS, and E.ON only with GARCH.

IV. CONCLUDING COMMENTS: COMPETITION POLICY, NATIONAL CHAMPIONS AND CORPORATE CONTROL

Case studies and econometric evidence presented in this paper, based on the experience of European countries, suggest

⁷ As in the previous section, three observations are taken into account for every event: the day before, the announcement day, and the day after the announcement.

⁸ These results are qualitatively the same using pooled OLS and SURE regressions for all firms, but the tests reveal that the system of equations does not significantly improve in efficiency relative to the individual firm regressions (see García-Rendón, 2010).

that takeovers in the energy sectors i) tend to coincide with regulatory reform; ii) are very costly for buying firms; iii) generate significant gains for target shareholders; and iv) depend on the degree of (product) market power in terms of the impact on competitors and the shareholders gains to be made in the market for corporate control.

An interesting feature of the takeovers of Hidroantábrico and Endesa examined above is that the regulatory game conditioned the nature and identity of the firms that eventually resulted from the takeover battles. In Hidroantábrico, eventually the winning bidder was Electricidade de Portugal in coalition with a regional savings bank (Cajastur) partially controlled by the Asturias regional government. In the Endesa takeovers some years later, Enel of Italy, with the Italian state as the largest bidder, won the contest against E.ON after forming a coalition with the Spanish construction company Acciona. As the examples suggest, there is a risk that a disproportionate amount of Type I errors will occur: some good mergers will not be authorized. There is then a trade off between the different expertise of several regulators. Wolak (2007) argues that "few mergers involving generation unit owners in wholesale electricity markets will be able to survive this multi-stage, federal and state antitrust and regulatory approval process and still provide value to the shareholders of the merged companies. The public benefit standard applied by most public utility commissions provides state governments with a substantial ability to extract financial concessions from the merging parties that may cause the merging parties to terminate potentially beneficial mergers." This raises the risk not only of efficient mergers not happening, but also of inefficient firms winning in some takeover battles: if winning takeover battles is costly and protracted, it will not be the firms that are best at producing electricity that win, but rather the best at playing the political game, or the ones able and willing to foot the bill of these protracted processes, such as firms with bad governance or public ownership.

A merger or acquisition (especially if it takes the form of a takeover) changes the objective function of policy makers because more light is projected into the industry, consumers and other stakeholders mobilize and this has a well documented impact on the potential (lower) wealth gains to be extracted from the transaction. The existing literature shows that mergers in regulated industries take longer to be completed and show a lower takeover success ratio than in other industries; there is also clear evidence that deregulation is usually accompanied by a takeover wave. There is a small literature on the optimal allocation of merger authority in the vertical chain of government (see Trillas, 2009). This literature focuses on the role of jurisdictional externalities in terms of the effect of a merger on the surplus that is captured by foreign consumers and the impact on foreign competitors, in a framework where a merger authority maximizes some combination of the surplus of national consumers and producers. There is no formal work to my knowledge on the role of regulatory authorities or on how to judge a merger from the point of view of it making more or less difficult the

role of regulators when there are jurisdictional externalities.

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